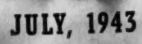
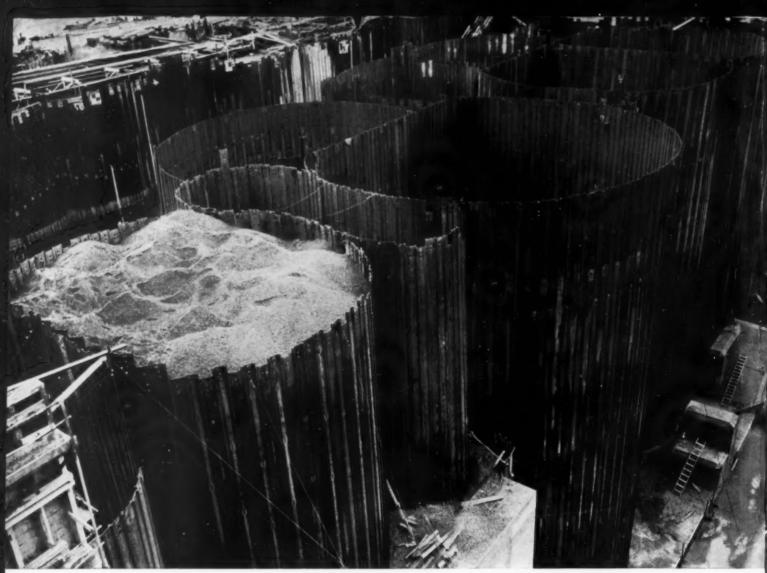
TECHNOLOGY DEPT.

Construction Methods





Y WAR BONDS AND STAMPS FOR VICTORY



Giant coffer dam made of Inland Steel Sheet Piling.

Inland Helps America Build for Victory

Many of America's greatest construction projects—dams, bridges, docks, etc.—have been speeded into war service by the use of Inland Steel Sheet Piling. Dams that control water stages on navigable rivers—dams that help provide extra power for vast war factories. Bridges that speed essential automobile, truck, and railroad traffic. Docks that make

possible the rapid loading and unloading of vital raw materials, food, and critical lendlease supplies that keep our Allies in the fight.

In addition to piling and structural shapes for construction, Inland also is sending great quantities of steel to plants making ships, tanks, shell, etc. Every ton of steel made by Inland works and fights for America.

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ARMY ELWANT INLAND STEEL CO.

38 S. Dearborn Street, Chicago Sales Offices: Milwaukee, Detroit, St. Paul, St. Louis, Kansas City, Cincinnati, New York

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A Pictorial Survey of Current Practice, Equipment and Materials

ROBERT K. TOMLIN, Editor

Editorial Staff: Vincent B. Smith, Paul Waoton (Washington
N. A. Bowers (San Francisco) Nelle Fitzgerald

Patricia McGerr

UILDINGS

Public—Defense Plant Corp. has awarded contract for \$18,000,000 steam power ant in Knox Co., Tenn., to J. A. Jones Construction Co., of Charlotte, N. C. How-Imit in Knox Co., Tenn., to J. A. Jones Construction Co., of Charlotte, N. C. Hoved S. Wright & Co., Inc., and L. H. Hoffman, of Seattle, Wash., received \$6,600,000 eattle housing contract. Low bid of \$2,500,000.\$5,000,000 for buildings, walks, pads, etc., at Boston, Mass., was submitted by Turner Construction Co., of Boston. mmy contract for modification center in Tulsa Co., Okla., to cost \$1,000,000-5,000,000 went to Corbetta Construction Co., of New York. Peter Kiewit Sons Co., f Omaha, Neb., has another Army contract for buildings and additional units in arpy Co., for under \$2,000,000. Chas. M. Dunning Contracting Co., of Oklahoma ity, Okla., is building a modification center for the Army for \$1,000,000-\$5,000,000. ontract for \$1,875,343 housing project at Seattle, Wash., was awarded to **Nettle- a & Baldwin.** of Seattle. **Turner Construction Co.**, of New York, has contract to a Baldwin, of Seattle. Turner Construction Co., of New York, has contract or sintering plant of reinforced concrete and steel in New York for more than 1,500,000. Brick frame building in Cuyahoga Co., Ohto, will be built for the time by Carl E. Erickson & Co., Inc., of Chicago, Ill., for \$1,439,500. Contract for 60-family-unit housing and 288-unit dormitory housing at Provo, S. D., was warded to Northwestern Engineering Co., of Rapid City, for \$1,255,946.

Industrial—Contract for oil refinery adaptation for an estimated \$50,000,000 in California was awarded to Foster-Wheeler Corp., of Los Angeles.

CURRENT JOBS

... and Who's Doing Them

FAVY CONSTRUCTION

Contract for airport improvements in South Dakota went to Peter Kiewit Sons a., of Omaha, Neb., for more than \$2,000,000. **Thos. Bates & Sons**, of Denver, blo., has Army contract for improvements in Denver Co., for less than \$2,000,000. unways, taxiway, etc., at Army Air Forces installation in Caddo Parish, La., will e built by Weymouth Construction Co., of Milwaukee, Wis., for more than \$1,000,e built by Weymouth Construction Co., of Milwaukee, Wis., for more than \$1,000,000. Low bid of \$1,046,223 for water pipeline, pumping plant and reservoir in orpus Christi, Tex., was received from Ernest Lloyd, of Fort Worth, and Aiken & Isman, of Corpus Christi. Civil Aeronautics Administration has awarded connact for improvements at Winston-Salem, N. C., for an estimated \$750,000-\$1,000,000 to Mecklenburg Construction Co., of Durham. Army contract for reconstructing test track in Wayne Co., Mich., for less than \$1,000,000 went to Cooke Construction. cting Co., of Detroit.

HIGHWAYS AND BRIDGES

Among recent highway contract awards are the following: Florida: \$287,759 to D. Manly, of Leesburg: and \$287,146 to Hall & Caddell, of Jacksonville. Idaho: 100,000.\$500,000 to River Bend Sand & Gravel Co., of Salem, Ore.; and \$100,000.500,000 to Morrison-Knudsen Co., Inc., of Boise. Illinois: \$258,665 to Geneva Construction Co., of Aurora; and \$554,537 to Maurice Hoefiken & Co., of Belle-\$50,000 to Morrison-Knudsen Co., Inc., of Boise. Illinois: \$258,665 to Geneva Construction Co., of Aurora; and \$554,537 to Maurice Hoefften & Co., of Belleville. Kentucky: \$235,282 to White Consolidated. Inc., of Chicago, Ill. Louisiana: thout \$554,500 to Cobb Bros. Construction Co., of Meridian, Miss. Mississippi: \$230,852 to Cook Construction Co., of Jackson. Nebraska: \$100,000-\$500,000 to Island Bros., of Dorchester. Ohio: \$100,000-\$500,000 to General Construction Co., of Columbus. Pennsylvania: \$500,810 to Fred Berlanti & Son. Inc., of Harrison, It Columbus. Pennsylvania: \$500,810 to Fred Berlanti & Son. Inc., of Harrison, It Columbus. Pennsylvania: \$500,810 to Fred Berlanti & Son. Inc., of Harrison, It Columbus. Pennsylvania: \$500,810 to Fred Berlanti & Son. Inc., of Harrison, It Columbus. Pennsylvania: \$500,010 to Fred Berlanti & Son. Inc., of Harrison, It Columbus. Pennsylvania: \$500,010 to Texas Bitulihic Co., and Construction Co., of Belzoni, Miss. Texas: \$100,000-\$500,000 to Texas Bitulihic Co., and \$100,000-\$500,000 to Construction Co., of Santa Fe, N. M. Washington: \$100,000-\$500,000 to R. I. Bair, of Spokane; and \$100,000-\$500,000 to I. D. Shotwell, of Tacoma. Wisconsin: \$268,050 to Universal Engineering Co., Medford.

JULY, 1943

CONSTRUCTION METHODS In a New Format

This month CONSTRUCTION METHODS makes its bow in a new format and type dress, planned originally as a post-war publishing project to improve service to both subscriber and advertiser. Current events, however, have influenced the decision to launch the new CONSTRUCTION METHODS now, instead of waiting for the end of the war. Working under high pressure, the construction industry has fulfilled the needs of the Army and the Navy for the greatest building program ever undertaken in this or any other country. While much work still remains to be done within the continental limits of the United States, emphasis is now shifting to construction overseas in the wake of our advancing military forces and to planning for post-war construction in this country. The indus-try has definitely entered a transition period of major significance and it seems appropriate, therefore, to make our new publishing plans effective now.

The new 9x12-in, size more than meets the War Production Board's recent paper-saving requirements and at the same time produces a magazine easier to handle and better adapted heretofore to clipping and preserving for reference in standard files. Better reproduction of both text and illustra-tions is sought by the use of a high grade of paper stock and the substitution of printing by letterpress instead of by the rotogravure process formerly used. The change also makes possible a more satisfactory printing schedule. To enhance the general appearance and readability of the printed page an ivory-tinted paper, easy on the eyes, has been substituted for white stock. And, finally, to give distinction and richness to the page, a dark mahogany shade of ink, making an effective color combination with the ivory tint of the paper, has been chosen instead of plain black ink.

large-size page that distinguished CONSTRUCTION METHODS in the past is a war casualty chargeable to shortage of paper. In its new, restyled form, however, the magazine continue its editorial policy of profuse pictorial illustration and will embody improvements that will find favor, we hope, among our engineer and contractor readers.

R. K. TOMLIN, Editor

MCGRAW-HILL PUBLISHING COMPANY, INC., 330 WEST 42d STREET, NEW YORK (18), N. Y. 1888

JAMES H. McGRAW, Founder and Honorary Chairman

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James H. McGraw, Jr.

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CHANGE OF ADDRESS

McGRAW-HILL PUBLISHING COMPANY 330 West 42nd Street, New York (18), N. Y.

Director of Circulation:

Please change my address on Construction Methods

Engineering Design -Creator of America's Mechanized Might

In war, as well as in peace, the design engineer is the vital link between the inventive mind and the mass-production reality

T is gratifying and interesting to note that reports of new "secret weapons" not only have reversed their course during the past few months . . . they also have increased in frequency. Once they filled us with dread and misgiving. Today the

miled us with dread and misgiving. Today the enemy does the worrying.

Word about the latest new Army weapon reached us as this was being written...a 2½ ton truck that performs on water as well as on land with equal efficiency. "The Duck", resembling an overgrown amphibious jeep, is particularly suited to landing operations where docks are lacking. Loaded with 20 fully equipped soldiers or their equivalent in supplies, its propeller runs it ashore. It climbs the beach on its six-wheel drive and continues the trip

This important addition to our "second-front" fighting equipment, coming so closely on the heels of the now famous tank-killing "Bazooka", is one of many history making contributors of American design engineers. design engineers — the men who transform nebulous ideas into practical realities — the men who make our war machines superior to those of our enemies.

Invasion and eventual victory became a certainty soon as America's design engineers threw their full effort into the war against aggression. Adaptrun effort into the war against aggression. Adapting intricate ordinance designs to mass production, these men developed weapons such as the M-10 destroyer of Rommel's tanks and brought out the new fighting planes and bombers that have won the air superiority that has turned the tide against the Axis. Taking ideas and giving them form, selecting the materials of construction, deciding upon the materials of construction, deciding upon the the materials of construction, deciding upon the method of fabrication, adapting the electrical and mechanical parts that power the product, specifying the finish that protects and beautifies it . . . these men are the focal point of American production. Their ingenuity has no parallel. Once they put automobiles on a mass production basis and within the reach of all. Today, after less than three years and with little previous experience in armament design, they have brought America's war weapons to the highest efficiency . . surpassing Hitler's weapons despite all the vaunted scientific wizardry of the Germans and their ten-year start.

At this point it is well to remember that while Germany's military might is traceable to its superi-

Germany's military might is traceable to its superi-ority in armament, many of the basic technological ority in armament, many of the basic technological discoveries (including the airplane and the submarine) are the products of American genius. The Germans always have been aware of the military advantages of technological superiority and have forced its expansion with all their might. They knew that mobility and surprise play a decisive role in modern warfare and their design engineers were kept busy, with unique intensity, to achieve unprecedented results in fast-moving, hard-hitting fighting equipment. Our own military and industrial engineers did not go into action until it became trial engineers did not go into action until it became certain that we would be involved in the conflict. But even before our country actually embarked on its Preparedness Program they were busily engaged in developing the designs of our war equipment. Tanks, planes, guns, ships and hundreds of other apparatus and machines of war were studied. Carefully selected committees of our national engineering societies were organized under the leadership of ing societies were organized under the leadership of the Army Ordnance Department to serve as advisors and consultants in the development of advanced designs of tanks and other motorized equipment of war. The above mentioned "Duck" and the now famous Sherman tank are just two of the many results of these efforts.

After the Preparedness Program had officially

been launched and Congress had made its initial appropriation, it was necessary to create the manu-facturing blueprints from which the engines of war could be built. Because the designs of the machines of production, as well as the designs of the products themselves, determine the speed and economy with which anything can be manufactured, the capacity of our industrial system is dependent, to a con-siderable extent, upon the ability and ingenuity of American design engineers. Germany's military might was successfully mechanized because Ger-many, for more than 10 years preceding the war, was riding the wave of a world-wide technological revolution. This revolution was as far-reaching as the advent of the electric motor and the internal combustion engine. It was born of the profusion of inventions and discoveries since the last war. German design engineers took advantage of every one of these

If we are to defeat our enemies and if we are to continue to play the leading role in the post-war world we must make better use of the new tech-nology than do our enemies. The job is up to American product engineers who already have made tremendous strides in designing the intricate ma-chinery of production and of war equipment. Much remains to be done however

It has been said that the Germans have not developed one single item that can be classified as basically original, nor are there indications that any so-called "secret weapon" will henceforth be developed by them. Today the Nazis are completely outclassed by the tremendous manpower of engineering brains that is at the disposal of American industry. Although we were faced by the same fundamental problems of shortages in materials, manpower and time, our engineers not only solved these problems quickly and effectively, but they outstripped the enemy by the preponderant weight of talent which we were able to bring to bear upon our problems. As is evidenced by studies of the designs of captured German war equipment, our airplanes are faster, carry heavier loads, have superrior protective armor and heavier armament. Our tanks, especially the Shermans, stand unmatched. Our tractor-mounted artillery excels theirs in fighting power. Our automotive vehicles are the envy of the world. Our battleships are supreme. Our signal and detection devices are frustrating all of our enemies' attempts to dominate the seas.

And as we approach the end of the conflict, the

And as we approach the end of the conflict, the pattern of which already has been set, the forces that converted American industry from peace to war-production will again be brought into play, and the product engineer will continue to be the fulcrum. Our post-war industry will grow from his blueprint. Nor will his job be any less urgent, any

This is the thirteenth of a series of

less responsible, any less sweeping in its effects than were his efforts during the war-preparedness

Since the cessation of the manufacture of peace-time goods, many new materials and production techniques have been developed. Plastics, synthetic rubber and magnesium in the field of materials were relatively new and restricted in their uses when war came. So were powder metallurgy, induction heat-ing, electrostatic heating, adhesives for joining metals and compressed resin-impregnated wood. The new possibilities in product design created by the electronic devices and applications developed during the war period virtually stun the imagination and the "atomic revolution" promises to change the entire pattern of manufacturing operations. Never before has there been so much speculation Since the cessation of the manufacture of peace-

Never before has there been so much speculation about the future as there is today. Looking forward, who can doubt our limitless capacity to continue our industrial world leadership?

While no one can predict developments in product design in the post-war period, certain it is that they will be so vastly different and so far superior to existing designs that they will obsolete most products as we know them today. With en-gines of vastly superior metals, designed to burn 100 octane gasoline and built to a precision ten times greater than that of pre-war engines, our postwar automobiles will give from 40 to 60 miles to the gallon. Tires will last from forty to fifty thou-sand miles. The comfort and smoothness with which these curs of tomorrow will glide along are undreamed of today. Polaroid windshields will eliminate the glare of oncoming headlights and the driver will need to give but scant attention to the manipulation of his simplified gear shifts.

According to no less an authority than Igor Sikorsky, we stand on the threshold of a new air age in which the helicopter will contribute to the greatest prosperity we have ever known.

Prophecies are hard to make at a time like this

but speedy house building seems to be a certainty in the world of tomorrow. Air conditioning, new methods of heating, humidifying and drying, prom-ise to be necessities in the post-war home. Vacuum ise to be necessities in the post-war home. Vacuum sweepers will be much lighter, less noisy and easier to manipulate. Washing-machines will be fully automatic and practically free of noise and vibration. Not only will our homes and most of the furnishings be of radically new design, but so will the factories and machines that produce them.

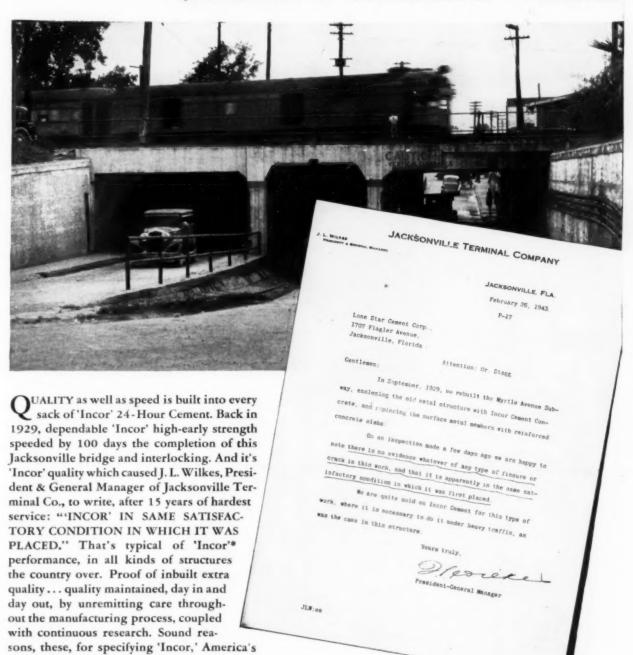
Only one factor can prevent the fulfillment of the dream of the product designer. His job is not accomplished over night. To convert sound ideas into production blueprints involves a great deal of time and money. The building of test models is an experience and telegraphy of the dream products. time and money. The building of test models is an expensive and tedious procedure. An abundance of seed money is required to perfect the product, to develop mass-production methods and to bring it to

It is the patriotic duty of every industrial leader to hasten these developments so that the material benefits created by them may speed our progress along the road of abundance.

editorials appearing monthly in all McGraw-Hill publications, reaching more than one and one-half million readers. They are dedicated to the purpose of telling the part that each Mus H. W. haw. N. industry is playing in the war effort and of informing the public on the magnificent war - production accom-plishments of America's industries.

President, McGraw-Hill Publishing Company, Inc.

IN THE LONG RUN ... QUALITY ALWAYS TELLS



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FIRST high early strength Portland cement.

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LONE STAR CEMENT, WITH ITS SUBSIDIARIES, IS ONE OF THE WORLD'S LARGEST CEMENT PRODUCERS: 15 MODERN MILLS, 25-MILLION BARRELS ANNUAL CAPACITY

Contractors Count on These Tools





BLACK & DECKER Quick-Saws are powerful, flexible, designed to cut through wood, composition materials and metals 10 times faster than these jobs can be done by hand. Three Quick-Saw models are available for every sawing job . . . they can be equipped with abrasive discs to cut through stone, ceramics, thin ferrous metals; or with crosscut, combination planer, miter, friction and nail-cutting blades. Here the Quick-Saw is cutting through tough, corrugated asbestos cement easily. Absolutely safe . . . Quick-Saw housings are light, strong, perfectly balanced for easy handling. Sturdy telescoping guard.

· hammering in concrete



BLACK & DECKER

Electric Hammers speed up any cutting or drilling operation that requires hammer action. Here a workman uses a powerful, light-weight Hammer to drill holes in concrete floor for metal partition base installations. Four brute Hammer models . . . 15 kinds of Hammer tools ... for faster, more efficient channeling, gouging, tamping, drilling and demolition operations in concrete, stone, brick or wood.

· · faster drilling and boring



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makes a complete line of heavy duty Drills, from 1/4" to 11/4", for driving Hole Saws, boring through heavy timbers and planking, drilling in hard alloy metals, doing precision work in bench drill stands, etc. Here a workman is drilling wood framework on war construction project. Contractors depend on Black & Decker Drills to save time in all kinds of drilling and boring operations.

BLACK & DECKER TOOLS

can be bought on the job from your nearby Distributor. For complete tooling information or help, consult him. The Black & Decker Mfg. Co., 759 Pennsylvania Ave., Towson-4, Maryland.

Black & Decker

PORTABLE ELECTRIC TOOLS



• Bottom-Dump EUCLIDS are helping to complete scores of military air bases in record time — in many cases weeks ahead of the rush schedules set up for these huge jobs. One of the reasons why contractors and engineers prefer Euclids for this work is because of the speed and positive dumping control of Bottom-Dump EUCLIDS.

Hopper doors are opened instantly by air controls so operators can "spot" the load accurately without stopping on the dump or fill. The exclusive Euclid "wheel-wind" closes the doors in a few seconds on the return trip. Time saved by Euclids in dumping heavy loads, plus the ability to move larger loads at higher speeds under difficult hauling conditions, means that urgently needed bases can be ready for use faster.

The EUCLID ROAD MACHINERY Co. CLEVELAND, OHIO





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SELF - POWERED
HAULING EQUIPMENT
FOR EARTH.. ROCK.. COAL.. ORE
CRAWLER WAGONS - BOTARY SCRAPERS - TAMPING BOLLERS





So...the Nazis couldn't sink her!

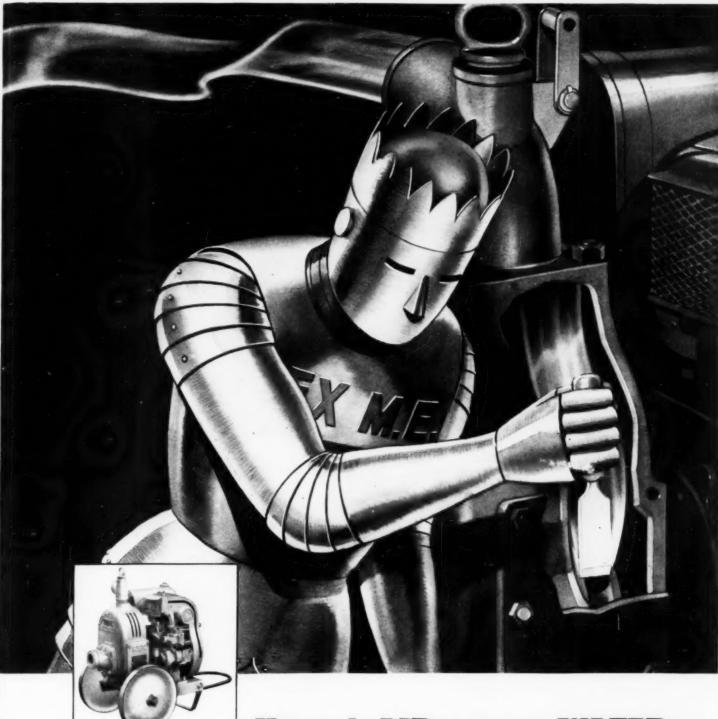
This 12,500-ton, all-welded tanker "Victoria" was torpedoed amidships. Her deck plates buckled but her bulkheads held. Then, the baffled Nazis smashed a second torpedo into her and left, confident she was finished. But those welds refused to yield—even to Nazi TNT. She made it to port and was repaired—ready for the subs again. Some ship, I say!

Some construction, you mean! This is just one of many welded ships that have refused to be licked by torpedoes. Just like our welded M-4 tanks which withstood the Nazi 88's in North Africa. Ships, tanks, planes and

guns—they're all welded for strength as well as for savings in time and materials.

Better products and lower costs just what I want in my business after the war. Then why shouldn't I weld my peace-time products?

You should! You MUST if you plan to survive in the face of war-developed ideas. And believe me, your ship of business will sink or float, depending on how well you can stand up against competition on WELD-ING ECONOMY. Why not start NOW to learn from Lincoln the latest kinks in welding thrift.



He peels AIR to pump WATER

REX Mechanical Engineering—REX M. E.

—is constantly developing in his research laboratories and proving in the field, ideas that enable Rex products to achieve maximum results at minimum cost and waste.

A famous example is the Air Peeler. It grew from an inspired *idea* into a sharp-edged blade of Z-Metal that peels a thin stream of *air* from the impeller of Rex Speed Prime Pumps when priming.

This Air Peeler gives Rex Speed Prime Pumps greater priming efficiency—enables them to deliver a greater volume of water in the face of suction line leaks that might stop ordinary pumps.

According to Rex M. E., the Air Peeler helps Rex

Speed Prime Pumps deliver all the volume all the time.

Rex Speed Prime Pumps have capacities from 3000 G.P.H. to 125,000 G.P.H. Each of these pumps, and the many new engineering *ideas* which give them added efficiency, is described in a factual, well-illustrated catalog. Write for it to Chain Belt Company, 1664 West Bruce Street, Milwaukee 4, Wisconsin.



CONSTRUCTION MACHINERY

Concrete Mixers • Moto-Mixers • Pumpcretes • Pavers Mortar and Plaster Mixers • Speed Prime Pumps





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TUNE IN THE TEXACO STAR THEATRE EVERY SUNDAY NIGHT-CBS



...BUT NOT A PROJECTILE

Suspended in mid-air, this projectile-like object (22" dia. x 8 ft. long) is a steel forging to help "pin" the bridge together. Assembling heavy steel members into bridge structures is a typical use of hoisting power made conveniently available through heavy-duty gasoline or Diesel engines.

To assure peak performance not only of hoisting machinery, but of trucks, tractors, bulldozers, etc., contractors everywhere are lubricating their heavy-duty gasoline and Diesel engines with Texaco.

Texaco Ursa Oil X** has both detergency and dispersion. Detergency keeps piston rings free and engine parts clean. Dispersion holds deposit-forming materials in suspension until

drained at oil-change time. The use of this oil prevents scuffing of rings, pistons, cylinders . . . protects alloy bearings.

For quieter-running, longer-lasting transmission and differential gears, use *Texaco Thuban*.

So effective have Texaco lubricants proved that they are definitely preferred in many important fields, a few of which are listed below.

A Texaco Lubrication Engineer will gladly cooperate in the selection of the most suitable lubricants for your equipment. Just phone the nearest of more than 2300 Texaco distributing points in the 48 States, or write:

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THEY PREFER TEXACO

- More busés, more bus lines and more bus-miles are lubricated and fueled with Texaco than with any other brand.
- ★ More stationary Diesel horsepower in the U. S. is lubricated with Texaco than with any other brand.
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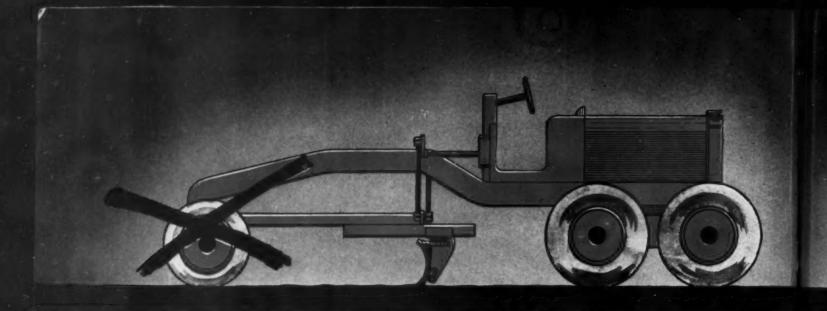
lined trains in the U. S. is lubricated with Texaco than with all other brands combined.

- More locomotives and railroad cars in the U. S. are lubricated with Texaco than with any other brand.
- ★ More revenue airline miles in the U. S. are flown with Texaco than with any other brand.

Lubricants and Fuels

FOR ALL CONTRACTORS' EQUIPMENT

HELP WIN THE WAR BY RETURNING EMPTY DRUMS PROMPTLY



» » DON'T HANDICAP

A MOTOR GRADER WITHOUT POWER ON THE FRONT WHEELS . . . IS LIKE A DRAFT HORSE WITH ROLLER SKATES ON HIS FRONT FEET



THE AUSTIN-WESTERN
ROAD MACHINERY CO.

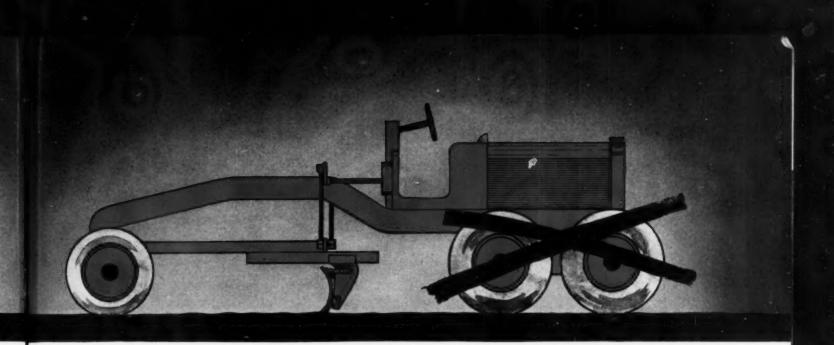
PULLUERS OF ROAD MACHINERS



Austin



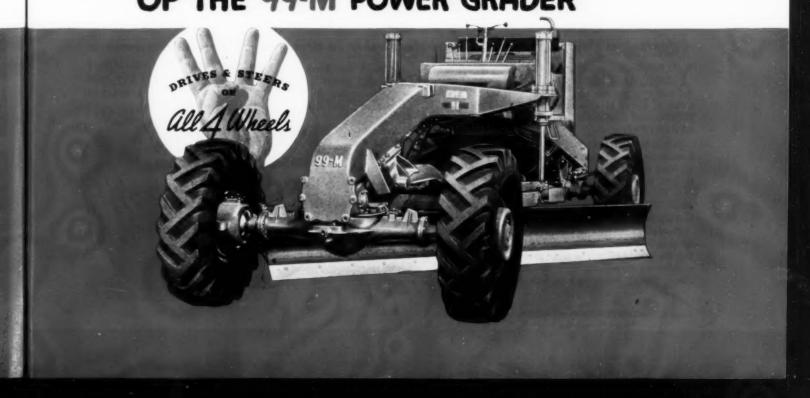
Western

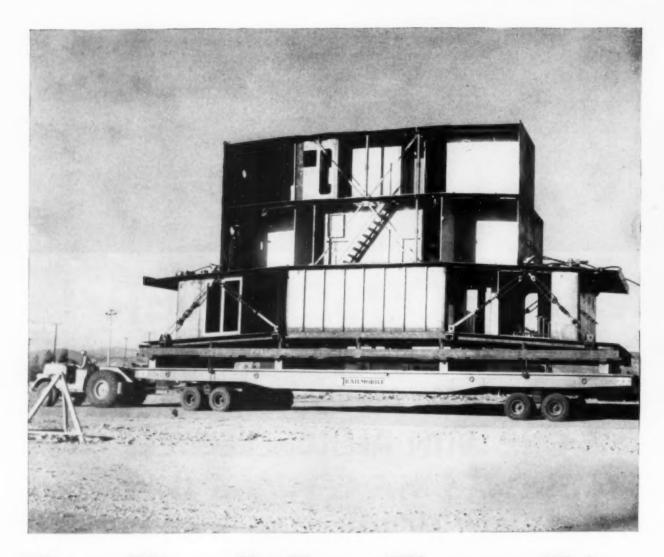


YOUR HORSEPOWER!

A MOTOR GRADER WITHOUT REAR STEER IS ONLY 50% AS MANEUVERABLE AS ONE WITH ALL-WHEEL STEER THESE ARE THE REASONS WHY

NO ORDINARY MOTOR GRADER CAN HOPE TO EQUAL THE ALL-AROUND PERFORMANCE OF THE "99-M" POWER GRADER





How They Deliver Victory Ships in 150-Ton Slices!

A typical example of B. F. Goodrich leadership in tires

YOU'VE seen some pretty big war loads on our highways lately. But did you ever see one like this? High as a house, heavy as a locomotive, it's a prefabricated segment of a Victory Ship on its way to the sea.

Just look at that driver! He's dwarfed almost beyond recognition by the pile of steel at his back. And look at that trailer! It's as long as a railroad flat car. Yet trailer and 150-ton load roll smoothly and safely along—on B. F. Goodrich Speedliner Silvertowns!

Ever since Pearl Harbor these sturdy, reliable Speedliners have been delivering the goods under the most grueling conditions ever faced by man or machine. At 50 below and in hub-deep

mud they helped build the Alaskan Highway. Under blazing desert skies and in sand that cuts like steel filings they brought up the men and munitions that pushed Rommel

out of Africa.

As for everyday jobs—they're doing them, too. Up and down the land Speed-liner Silvertowns are setting amazing new mileage records on all types of trucking operations. And while you may never have to move ship sections or fight your way through mud and sand, it's certainly reassuring to have such mighty reserves of

strength and durability at your service.

Remember the leadership of B. F. Goodrich when next you buy truck tires. And remember to see your B. F. Goodrich dealer first.





Here is a group of men you should know about. They are the Lorain distributors spanning the breadth and length of the country to serve the construction industry.

They are a very real advance guard for post-war planning because without their functions and services, any post-war construction boom may be delayed or handicapped. Right now, they can perform these two very important functions to help you get ready:

1 They can offer a valuable war-time service of equipment con-servation and repair of badly needed

They are the source for all in-2 They are the source to a formation on any new types or formation on any new types or designs of post-war equipment, and can advise you on the latest, most efficient methods of material handling.

These men will be in business after the war. They stand ready to work with you for a quicker victory and a progressive, profitable post-war period. Why not get acquainted now?

THE THEW SHOVEL CO. Lorain, Ohio

ALA. ... J. D. Pittman Tractor Co., Birmingham Burford-Toothaker Tractor, Montgom'y

ARIZ. ... State Tractor & Equip. Co., Phoenix

ARK. ...Little Rock Road Mchy., Little Rock

CAL. ... Le Roi-Rix Mchy. Co., Los Angeles

Coast Equip. Co., San Francisco

coto. .. Liberty Trucks & Parts Co., Denver CONN. . . Truck Sales & Parts Co., Bridgeport

FLA. ... Clewiston Motor Co., Clewiston Burgman Tractor Equip., Jacksonville Shelley Tractor & Equip. Co., Miami

GA.Yancey Tractor Co., Albany Yancey Bros. Co., Atlanta

IDAHO... Bunting Tractor, Boise and Twin Falls

NL.R. C. Larkin Co., Chicago Peoria Tractor & Equip. Co., Peoria Central Illinois Tractor & Equip. Co., Springfield

IND.Indiana Equipment Co., Indianapolis

IOWA. ..Gierke-Robinson Co., Davenport Carl R. Miller Tractor Co., Des Moines

KY.Roy C. Whayne Supply Co., Louisville

LA.Louisiana Tractor & Mchy., Baton Rouge and Monroe

MD.Clark & Freeland, Inc., Baltimore

MASS. .. Tractors, Inc., Newton Highlands.

NEV. ... Sanford Tractor & Equip Co., Reno N. J. ... Grey Steel Products Co., Glen Rock

N. Y. ... Good Roads Mchy. Co., Albany

T. E. Potts, Kenmore

N. C. ... Carolina Tractor & Equip Co., Raleigh and Salisbury

OHIO ... Highway Equip. Co., Cincinnati The Taylor Tractor Co., Columbus

OKLA. .. Wylie-Stewart Mchy. Co., Okla. City

ORE. ... Bunting Tractor Co., Inc., La Grande Columbia Equip. Co., Portland

PA.L. B. Smith, Inc., Camp Hill Atlas Equip. Corp., Pittsburgh H. C. Knight, Philadelphia

R. I. Tractors, Inc., Providence

S. C. . . . Jeff Hunt Road Mchy. Co., Columbia

TENN. ..R. L. Harris, Inc., Knoxville Taylor Mchy. Co., Memphis McCarthy, Jones & Woodward, Nashville

TEX.... Browning-Ferris, Dallas and Houston

UTAH ... Cate Equip. Co., Inc., Salt Lake City

VA. Richmond Mchy. & Equip. Co., Richm'd

WASH...Columbia Equip. Co., Spokane A. H. Cox & Co., Seattle

WIS. Brebner-Sinz Mchy. Co., Green Bay Drott Tractor Co., Inc., Milwaukee

WYO. .. Wilson Equip. & Supply Co., Cheyenne

(1) Pille





SMITH "OLD TIMER" KEEPS PACE WITH NEW MIXER ON 3 BIG DEFENSE JOBS!

You just can't keep a Smith Tilter down. After faithfully mixing concrete for over a decade, without being rebuilt, the machine continues to make the grade... even on critical, war-time construction jobs.

Here, for example, a 13-year old Smith 84-S Tilter is working side by side with a new Smith 84-S... successively pouring concrete on three vital war projects. First, a large ordnance plant in Indiana... then a similar plant in Texas... finally, a large U. S. Naval Depot in Utah. Three tough assignments, yet both machines are still in excellent condition, ready for service on other important war projects.

For 43 years, the Smith Tilter has set the pace for mixers on big concrete projects, earning a well-deserved reputation for fast loading, thorough "End-to-Center" mixing, rapid "Tilt and Pour" discharge and above all . . . DEPENDABILITY! All sizes available, up to 4 yards per batch.

Write for catalog.

THE T. L. SMITH COMPANY 2851 N. 32nd St., Milwaukee, Wis., U.S.A.



SMITH MIXERS
USED ON THE WORLD'S GREATEST CONCRETE PROJECTS



High Dumping Clearance Speeds Operation to New Records—with the HEIL **Bottom-Dump Trailer Wagon**

By employing a construction principle long accepted in other construction equipment but never before used in a dump wagon, Heil engineers have made possible a totally new standard of performance for this type of equipment. The high clearance doors are POWER-OPENED in 2 seconds. The Heil cable power control unit is direct-connected to the tractor engine, and operates independently of the tractor transmission at any time when the engine is running. The dumping operation is under fingertip control. The load lets go all at once or spreads as with a cable scraper, at the will of the operator. This new Heil unit dumps and gets away in a flash. You need it to compete successfully in post-war earthmoving operations. Get the complete story now and be prepared. Post-war orders now being accepted. Write for bulletin.

> Lett: Heil Cable Scraper Inter-Right: Heil Hydraulic Bulldozers

windrow. No door dragging in the dirt to slow up the unit and prevent sharp angle turning

26" Clearance with Doors Closed

Clamshell Principle

The familiar clamshell is opened by power, swings closed by gravity. That is exactly how this new Heil unit operates. When the dumping doors are pulled open by CABLE POWER, the doors swing up alongside the hopper - out of the way. The high clearance doors are interlocked, completely synchronized, fast and positive in operation. Patented construction.





is engaged in all-out war production for Victory



GENERAL OFFICES

MILWAUKEE 7, WISCONSIN



BIG PUSH ABROAD

needs all-out support at home. For increased service hours from CONSTRUCTION equipment use . . .



These oils and greases give safe lubrication in continuous operation, and overload emergencies.

Write for "The Service Factor"—a free publication devoted to the solution of lubricating problems.



SINCLAIR LUBRICANTS-FUELS

FOR FULL INFORMATION OR LUBRICATION COUNSEL WRITE NEAREST SINCLAIR OFFICE

SINCLAIR REFINING COMPANY (Inc.)

2540 WEST CERMAKERGAD CHICAGO

10 WEST 51ST STREET NEW YORK CITY

RIALTO BLDG. KANSAS CITY

573 WEST PEACHTREE STREET ATLANTA

FAIR BUILDING FT. WORTH

Page 16 - CONSTRUCTION METHODS - July 1943

TOMORICA

NORTHWEST ENGINEERING CO. 1727 Steger Bldg. · 28 E. Jackson Blvd. Chicago · Illinois

EQUIPMENT

MAN WITH

NORTH



A Firestone

TIRE SPECIALIST Can Help Keep Your Equipment on the Job!

MAINTENANCE of equipment is the most important job that faces most contractors today. Never before has there been so much emphasis on saving fuel and tires. To help you obtain full service from your tire equipment, Firestone offers you the services of a specially-trained tire specialist. He will analyze your earth-mover tire equipment and:

- * Report on tire abuses that are causing premature wear.
- ★ Recommend treading and repairing where necessary.
- ★ Advise on which wheels treaded and repaired tires should be used.
- ★ Examine tires removed from service for additional evidence that may show how to make your tires last longer.
- ★ Will assist your tire service man in setting up a regular routine for earth-mover tire maintenance.

Don't delay — act today! Call your nearby Firestone Dealer or Firestone Store and arrange for a complete analysis of the tires on your earth-moving equipment by a Firestone tire specialist.

GROUND-GRIP TRUCK TIRE

For use on driving wheels of earthmoving trucks, truck tractors and semitrailer units in soft going or fill.

ROCK GRIP

Cut-resisting tread with double thick sidewalls for greater strength in stripmining operations.

ALL-NON-SKID EARTH-MOVER TIRE

For scrapers and trailer wagons. Low inflation pressures prevent impact breaks and provide maximum flotation and traction.

ROAD BUILDER TIRE Has no equal for use on road graders. Compression fit of beads

pression ht of beads allows low pressures without slipping on rims. Ground Grip treadforextratraction.



Listen to the Voice of Firestone with Richard Crooks and the Firestone Symphony Orchestra, under the direction of Alfred Wallenstein, Monday evenings, over N. B. C.

Congress, 1943. The Firestone Tire & Bubber Co.



Direct Down-Pressure on the Axis!

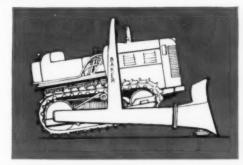
The exclusive direct lift and down-pressure of the blade on Baker Hydraulic Bulldozers and Gradebuilders is a pain in the neck to Axis chest thumpers.

This simple, positive method of control permits the entire weight of the tractor front end to be exerted on the blade—the blade does not depend on its weight alone to force it into the ground. That's why Bakers get out bigger loads faster, every trip, all through each shift.

Their ruggedness and simplicity cuts maintenance costs to the bone. Their design makes the tractor engine more accessible. And they have all of the other features-moldboard level on rough ground, quick interchangeability of moldboards, tractor back end available for winch, etc. that you want in a bulldozer.

Beside rushing camps, landing fields and war plant sites to completion, Bakers are making landing strips in dense jungles and on desert sands, clearing debris from bombed cities, extending military roads in the frozen North and bringing direct down-pressure to bear on foes of democracy in other ways.

THE BAKER MANUFACTURING CO. 506 Stanford Avenue Springfield, Illinois



Baker Hydraulic Bulldozers really bear down!





The Modern Tractor Equipment Line for LEVELING AND GRADE BUILDING SNOW REMOVAL ROAD MAINTENANCE

How 70 Get TOP WINCH PERFORMANCE

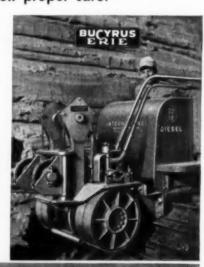


equipment can't move dirt efficiently if winch trouble piles up lost time. Nor will the best winch stand up under the punishment of high-speed 3-shift wartime service if maintenance is neglected. Bucyrus-Erie Power Control Units are built for long life and hard usage. Here are a few hints on their proper care:

- 1. Clutch bands receive more wear than the brake bands. Interchange them occasionally to obtain maximum life from the linings.
- Check the adjustment of clutch and brake bands daily. Keep linings clean.
- Disassemble sheaves and clean them occasionally to prolong life of the bearings and other parts.

Keep your tractor equipment producing . . . your nearest International TracTracTor Distributor will be glad to advise you on proper maintenance and lubrication.

- 4. Check the oil level in the gear case often, keep it clean and free from dirt and cuttings.
- If oil seals are leaking, try to tighten them by cutting and shortening the springs inside the seals.
- Lubricate regularly using good grade lubricants and follow the manufacturer's instructions carefully.

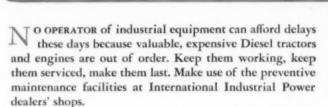




SEE YOUR
INTERNATIONAL TRACTRACTOR
DISTRIBUTOR

INTERNATIONAL DIESEL OWNERS-

Let the International
Industrial Power Dealer
Give Your Diesel
Injection Pumps and
Electrical Equipment
Regular Check-ups
with this Servicing
Unit...Manned by
Factory-Instructed
Mechanics



The fuel injection pump and electrical equipment service unit shown above is one of our dealers' biggest service "extras," installed to help keep your equipment on the job. This special test equipment, plus the technical knowledge of highly trained mechanics, plus special care to encourage cleanliness* during the repair or rebuilding operation, are your assurances that your injection pump will be properly serviced or rebuilt; that your engine magnetos and electrical systems will be properly serviced, too. See the International Industrial Power dealer for SERVICE YOU CAN DEPEND ON!

INTERNATIONAL HARVESTER COMPANY 180 North Michigan Avenue Chicago, Illinois

* Many of our dealers have air conditioned, dustproof test rooms for this equipment; other dealers will have them soon.



These Tests and Adjustments Can All Be Made With This Equipment—

- 1. Fuel Distribution Test
 - 2. Fuel Pressure Test (Diesel injection pumps)
 - 3. Fuel Pressure Test (Diesel injection nozzles)
- 4. Running Test (magnetos)
 - 5. Running Test (generators)
 - 6. Condenser Test
 - 7. Magnet Recharging
 - 8. High and Low Voltage Electric Circuit Test



INVEST IN AMERICA-BUY MORE WAR BONDS!

NTERNATIONAL



STREAMLINE YOUR ATTACHMENTS with ROEBLING Swaged Fittings!

FOR THESE AND MANY OTHER ASSEMBLIES



Develop full strength of wire rope up to 11/4 inch in ONE economical fitting

Get wire-rope-rigged equipment back on the job faster . . . release skilled wire rope men for other work . . . by specifying Roebling complete SWAGED assemblies that develop 100% of the strength of the rope! Convenient—your rope comes to you cut to length and fitted on one or both ends, all ready to go to work. Economical—you can get these assemblies for a lot less than it would cost you to splice or socket them on the job.

Swaged fittings as a means of making wire rope connections were popularized by the Aircraft Industry—where speed, uniformity and maximum strength factors are so important. Now you can get these same advantages for all industrial applications where wire rope up to 1¼" diameter is used.

For prompt action—write, stating your requirements briefly. Our engineers will make recommendations on how Roebling Swaged Fittings can be used to best advantage—and quote prices and delivery without obligation.

JOHN A. ROEBLING'S SONS COMPANY

TRENTON, NEW JERSEY

Branches and Warehouses in Principal Cities

ROEBLING



Pacemaker in Wire Products

YOU CAN'T MISS ...

You can't miss enjoying better performance... lower upkeep cost... improved lubrication... complete parts information... with the new BLAW-KNOX CONSTRUCTION EQUIPMENT MANUALS.

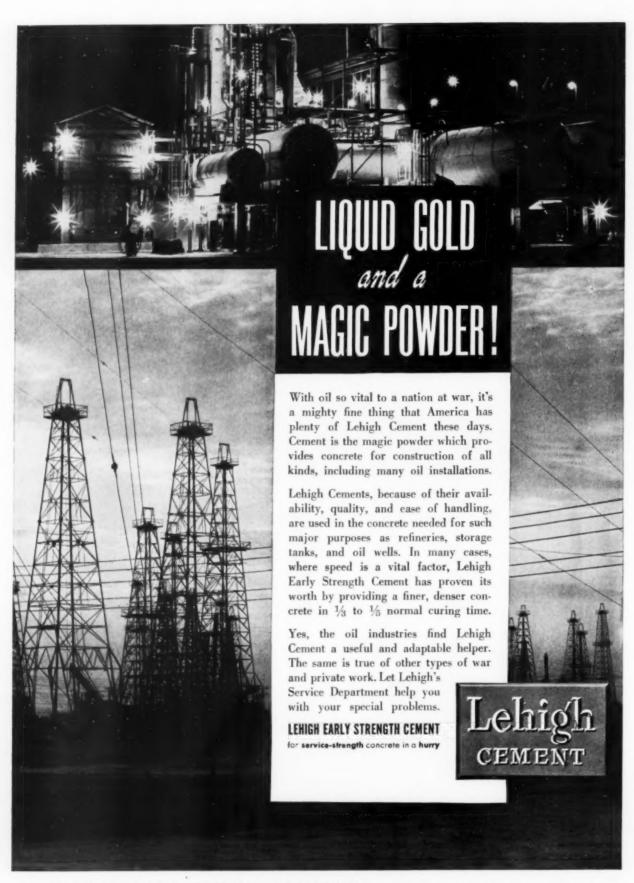
These instruction manuals are real hand books which illustrate and explain every part of the machine, even the engine drive down to the smallest cotter pin and lock washer.

The manuals tell how to <u>operate</u> the equipment efficiently...how to <u>lubricate</u> correctly ...how to make <u>adjustments</u> and <u>repairs</u>... how to diagnose troubles—how to overcome them. They include complete parts lists.

All the manuals are fully illustrated with detailed pictures and drawings... all information is completely cross-indexed and easy to find.

With these new manuals, users of Blaw-Knox Construction Equipment can reduce "time-outs" for replacement and repairs, improve and simplify maintenance, establish a more correct lubricating procedure, and enjoy more continuous and satisfactory operation on the job.







your equipment. A recent example is this six-year-old Model WM, owned by J. A. Krusell, Waukesha, Wis. Hauled into the shop of an A-C dealer, Drott Tractor Company, for repairs one day . . . it was back rushing essential work the next! In less than a day's time a new gear, pinion and bearings were placed in a final drive . . . a steering clutch was rebuilt . . . new leaves were installed in the stabilizer spring . . . old-type rollers were replaced with a set of the new Positive-Seal truck wheels that require lubrication only once in 200 hours.

Busy as he is on war jobs, your Allis-Chalmers dealer is still taking good care of essential civilian duction line fashion — yet each is carefully supervised and handled. His staff of factory-trained mechanics know exactly what to do and how to do it — and have the right type tools to get it done in minimum time.

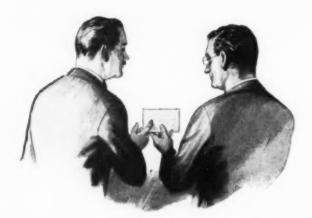
Next time you want a service job handled in a hurry, done right and at small cost \dots call your Allis-

Chalmers dealer. You'll have your unit back on the job in no time—with many more hours of efficient performance added.





ALLIS-CHALMERS



The Next Step Beyond Cooperation-SYNERGISM

Cooperation paves the way for synergistic thinking—when minds, cooperating to get better results, "click" from the impact of idea meeting idea and evolve a result that is far greater than the sum total of the ideas expressed.

Synergism is the way to get results bigger than you anticipate.

The construction field is particularly challenging to synergistic thinking. Scarcely a day goes by that does not pose a new problem.

Where blasting enters the contractor's picture, Atlas technical men, thinking synergistically with our customers, have frequently been able to suggest a blasting formula that saved many a day's working time, many a dollar in costs.

Atlas Technical Service puts "know-how" on the job. Here is an example that achieved a "2 + 2 = 5" result.



Here, the job permitted truck driving along the top for handling stemming material. By improvising a new back with a small chute door, the truck was fitted for efficient, effective stemming. How it saves on large blasts! Note how the board is held to protect blasting cap wires. Obvious? Sure—but it is a new slant.

Here, a bit of salvaged copper wire and a piece of rope have been turned into a time-saving gadget for lowering gelatins down smooth bore holes. Wire is bent and works just like a pair of ice tongs. When the cartridge is seated, a jerk on the rope tears the "tongs" free to be used again. Simple? Of course—but a tremendous time saver.



Got a blasting problem that's part of your next contract? Consult Atlas. Get Atlas' friendly synergistic thinking working for you.





ATLAS POWDER COMPANY, Wilmington, Del. Offices in principal cities · Cable Address-Atpowco

NEW, MODILOADER



LIGHTER-SIMPLER-SPEEDS EVERY LOADING JOB WITH "STRAIGHT-LINE" LOADING ACTION . . .

SPECIFICATIONS

MODEL W4-1 MOBILOADER

BUCKET CAPACITY

Weight, approx. 6150 lbs.

Dumping Height 8 feet

Overall Height, bucket lowered, 7'6"

Overall Height, bucket raised, 16'2"

Operates With "Caterpillar" Diesel D4 Tractor ATHEY MOBILOADERS . . . the new, time-saving method of loading materials . . . have been proved by hundreds of contractors, municipalities, mines and other owners during the past four years. Now, comes an improved Athey MobiLoader that operates on the 35 h.p. "Caterpillar" Diesel D4 Tractor. It has many advancements in design over its predecessor model, but retains those features which helped Athey MobiLoaders establish such outstanding records of speed and economy in loading.

The Model W4-1 is "streamlined"

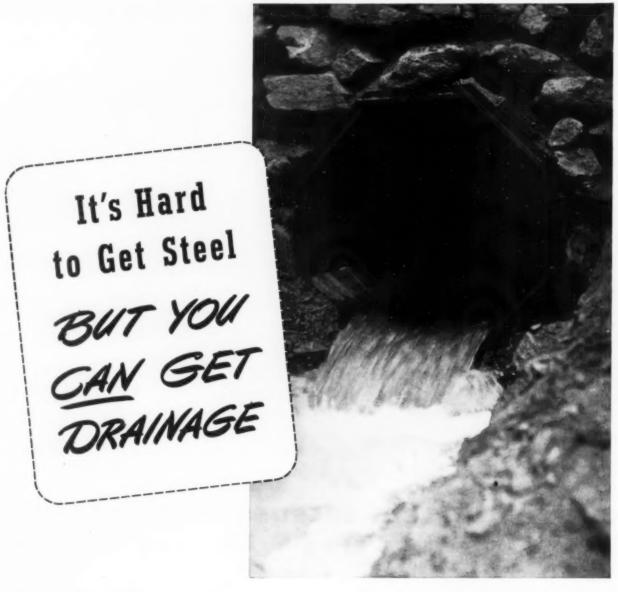
and greatly simplified . . . has lower center of gravity . . . increased stability . . . improved bucket design . . . reduced height, making it easier to transport from one job to the next. It digs, hauls and dumps its load in "straight-line" action . . . eliminates turning of tractor to discharge load.

ing action.

MobiLoaders handle general excavating—or stockpile loading of gravel, rock, sand, coal, ore, earth or clay.

Send for the interesting folder showing a production chart on what the Model W4-1 will do. Write Athey Truss Wheel Co., 5631 W. 65th St., Chicago, Ill., for Form 604.

ATHEY MOBILOADERS



• America at war can afford no interruption of vital traffic. Proper drainage is doubly important now. Yet desirable as it is, steel must not be used in any drainage structure unless engineering integrity demands it. Even so, perhaps we can help you in other ways.

For example, ARMGO Emergency Pipe may be just the answer to your wartime drainage problems. This completely new design in wood pipe requires no steel sheets, bands, wire mesh or metal reinforcing. It is easy to handle and has ample strength to meet engineering standards. Armco Wood pipe is designed to last through the emergency. On more permanent installations, when replacement becomes necessary, a corrugated metal pipe may easily be threaded through or jacked around the wood structure.

Remember that ARMCO Corrugated Metal Pipe is only on temporary "leave of absence." It will be back with its flexible strength, ease of handling, tight joints, long

lengths and low installation costs. Asbestos-Bonded Coatings and thick bituminous pavements will be back too—better than ever before—to guard against corrosion and erosion.

Meanwhile, can we assist with your drainage problems? The answer may be in the use of non-strategic materials, or in suggestions for repairing and salvaging older structures. Write to us for information. Armco Drainage Products Association, 15 Curtis St., Middletown, O.



EMERGENCY PIPE





IT'S NO TIME FOR GEAR TROUBLES!

Everybody's in a hurry—and equipment's none too plentiful. You probably need every machine you can muster. Read below how Mobilube Gear Oil helps you keep more machines in active service. Save Time!



WEEP EQUIPMENT OUT OF THE SHOP

—JOBS ON SCHEDULE! Gear troubles

—breakdowns on the job—waste manpower, too... and may throw your whole
work schedule out of kilter. Your SoconyVacuum man can help you avoid this

—and other time-wasting troubles.



Mobilube Gear Oils have been developed especially to meet fleet requirements for *straight mineral oils* for transmissions and axles in heavy duty service.

They are highly stable—free of abrasives, soaps, fillers or foreign materials of any kind—and they will not thicken excessively when cold.

This means they help keep scuffing and wear at a minimum—withstand long service—and, when used in the correct grade, prevent wasteful drag on gears and difficult shifting in cold weather.

77 years of experience in developing special lubricants for specific jobs stand back of Mobilube Gear Oils. Get in touch with the Socony-Vacuum man today. He can help you keep equipment working steadily—jobs on schedule.

SOCONY-VACUUM OIL CO., INC. and Affiliates: Magnolia Petroleum Co., General Petroleum Corporation of Calif.



SOCONY-VACUUM FUELS, LUBRICANTS AND ENGINEERING SERVICE



to quick certain victory.

In your operations, too, you will find that Velvetouch clutch facings and brake linings prevent costly breakdowns. Velvetouch wears 3 to 7 times longer than ordinary friction materials . . . requires fewer adjustments . . . enables you to move more yards per day.

Specify Velvetouch for your tractors and shovels, and for other machinery where you require brakes and clutches that never grab, chatter or slip!













TRADE MARK BEG II S BAT OF

1374 EAST 511 STRE

PIONEERS IN PUTTING POWDER METALLURGY TO WORK FOR INDUSTRY









THE track rollers that guide the track and distribute the weight of your tractor over a large ground area are mighty important to its operation. And under today's tough working schedules they take a lot of punishment.

In addition to proper lubrication, there are several things you can do to prolong roller life. One is to rotate the position of the rollers, just as you would switch tires on a car. This is especially necessary if you use equipment that puts extra weight and strain on one part of the tractor—front, rear or side. If some of your track rollers are wearing faster than others, it is a simple matter to change them around.

Tracks should be kept in alignment so they do not wear roller flanges abnormally.

And it helps if you use reasonable care in driving the tractor over rough, rocky ground, and avoid extra-heavy jolts.

When the rollers are worn to the point of needing replacement, your "Caterpillar" dealer has a new shop method that restores their wearing surfaces and puts them back to work. By welding, he first builds them up, and then grinds them to the diameter of a new roller. They are then ready for plenty of additional service.

The welding method utilizes the old roller which would otherwise be scrapped. This is typical of the modern techniques used by "Caterpillar" dealers to keep equipment working and to conserve time, money and war-scarce metal.

Today our fighting forces have first call on new machines and parts. That means we must all do everything we can to conserve the machines in use.

Preventive maintenance is one of your "Caterpillar" dealer's main jobs. See him and ask him about the new meaning of "Caterpillar" service.

WHAT ABOUT NEW "CATERPILLAR" DIESEL TRACTORS?

To provide for war-essential work at home, the War Production Board has made 15% of "Caterpillar" Diesel Tractor production available for civilian purchase. If you need one of these machines and are qualified to have one, your "Caterpillar" dealer can help you obtain it. Ask him for details and advice.

CATERPILLAR DIESEL

CATERPILLAR TRACTOR CO., PEORIA, ILLINOIS

TO WIN THE WAR: WORK-FIGHT-BUY U. S. WAR BONDS!





A taut steel rope angles down into the boiling wake, so small in proportion to the vessel that it seems like a fishing line over the stern of a rowboat.

Far off over the rim of the horizon, there's a flicker of light followed by a sound like distant thunder. The steel rope jerks as if some huge sea monster were nibbling at it.

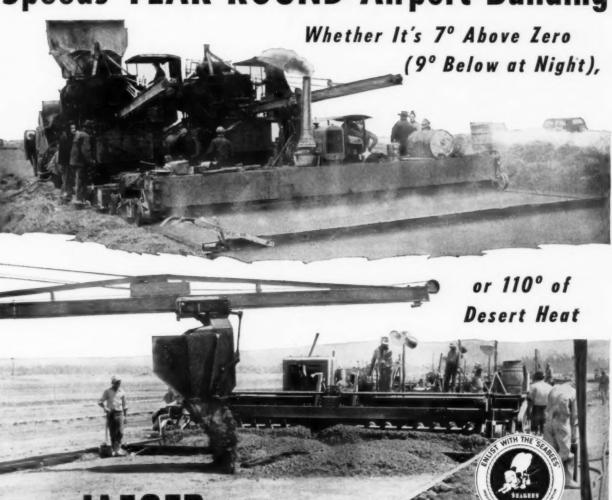
The steel line is not for fishing. It's a target-towing hawser. The distant thunder comes from the big guns of a battleship. The ''nibbling'' is the impact of heavy shells upon the target.

Naval target-towing hawser is one of the many special war ropes now being produced by Bethlehem Steel Company. Because of its great length, this rope must be light yet incredibly strong. It must also resist corrosion by sea water. To solve this particular problem, Bethlehem developed steel rope wire with very high strength and shock resistance. This wire is coated by the exclusive bethanizing process. Bethanizing is an electrolytic coating process which produces the purest, tightest, most uniform zinc armor ever applied to rope wire, and yet does not reduce the toughness or fatigue-resistance of the wire.

Every foot of wire rope made by Bethlehem is helping in some way to win the war. We're working 168 hours a week to supply the battlefronts and yet not neglect the mines, quarries, mills, factories and dozens of other "musts" at home.



Mechanized Paving {JAEGER-LAKEWOOD} Speeds YEAR'ROUND Airport Building



THIS JAEGER TEAM CAN TAKE IT!

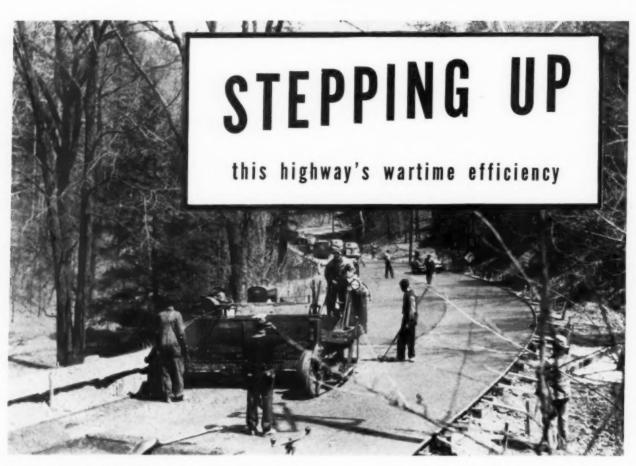


The Finishing Machine (originated by Jaeger-Lakewood in 1917) and the Concrete Spreader (originated by Jaeger in 1931), teamed with the modern paver, have made possible today's year 'round paving of vitally-needed airports, made possible today's high production*, made practicable the handling of today's dry mixes without segregation and with a minimum of manpower. By finishing millions of sq. yds. of slab in subfreezing temperatures and, on some jobs, maintaining constant 24-hours-a-day operation over many months, these machines have further demonstrated why contractors depend on Jaegerengineered equipment to meet their severest schedules and deliver a satisfactory and profitable finished job.

*Over 275 linear ft, per hour in 25 ft, width, over 475 linear ft, in 10 ft, width of denser, stronger, smoother slab.

THE JAEGER MACHINE CO. 800 Dublin Ave. Columbus, Ohio

Mixers, Pumps, Hoists, Paving Equipment



5-mile section of U. S. Highway No. 6 east of Cleveland, O., being widened and resurfaced with TEXACO Asphaltic Concrete,

Five miles of U. S. 6 near Cleveland, O., had become worn, hard on tires — narrow sections were slowing up important wartime traffic.

Plans were made to widen part of the old road with Black Base and to resurface the highway with Asphaltic Concrete, half width at a time.

To make the job harder, there were sharp and heavily superelevated curves, guard rails, narrow berms and steep grades. However, the new TEXACO Asphaltic Concrete pavement was finished in good

Wartime traffic drives with greater speed and safety over the new TEXACO-paved section of U. S. 6—and with less wear on precious tires.

time, and remained in use all during the work.

A TEXACO representative, who specializes in Asphalt, is at your service.

THE TEXAS COMPANY, Asphalt Sales Dept., 135 E. 42nd St., New York City Philadelphia Richmond Boston Chicago Jacksonville Houston



TEXACO ASPHALT



OF YOUR CROWD AND DRIVE CHAINS

You can add years to the life of your crowd and drive chains by guarding against uneven wear in pins and bushings.

This newest P&H Wartime Service Bulletin

shows you how to test for wear—how to reverse pins and bushings the simplest, easiest way. It'll save you money—prevent delays on the job—save time in replacements—and help conserve critical materials.

MAKE WAR ON WEAR WITH PROPER CARE

To reduce maintenance to an absolute minimum, P&H provides all welded construction of rolled alloy steels, true rolling crawlers, hydraulic control and many other outstanding advantages.

General Office: 4494 W. National Avenue, Milwaukee, Wisconsin





Write today for your copy of this new Bulletin. Ask for folder No. D.51.

PARSONS



TRENCHERS Speedily Build Home Defense

Long, wide crawlers, three point suspension, overload clutch, two speeds on buckets and conveyor along with 16 digging speeds are a few of Parsons' Trenchers outstanding features.

Finishing ahead of schedule means only one thing—SPEED. That's how the Parsons' Trenchers have built and will continue to build a home defense that will not be penetrated by the enemy. With sixteen digging speeds ranging from eleven to thirty-nine

inches per minute how could they help but be a home defense weapon. Add to this sixteen forward speed changes and four different reverse accelerations. The traveling speed of these rugged metal soldiers is one and three-fourths miles per hour. An added speed feature is the two speeds on the bucket line. For SPEED as well as clean and deep digging, Parsons has been the accepted standard for over thirty-five years.

THE PARSONS COMPANY · NEWTON, IOWA







M^{ANY} a county highway department is going to have to solve the problem of road salvage in the face of scarcities of material, men and money with soil cement and Adnun Pavers.

Adnun Pavers proved their ability on soil cement several years ago when Heldenfels Brothers of Houston, Texas demonstrated that real savings were possible with Adnuns and Soil Cement on a 34 mile project in Texas.

Your Adnun has features for this work that no other type of machine can offer. "Continuous Course Correction" assures more accurate distribution and depth of material. The power cut-off makes possible definite control of materials from the hopper. With the Adnun Raker Bar, mixing is continuous, and finally, Hydraulic Controls assure easy, smooth operation.

Adnuns lay any type of blacktop pavement as well as stone, slag, or soil cement. Initial compaction is provided by the design of the cutter bar without vibration that brings fats to the surface.

Here is a machine that gives you true leveling without forms and a course that rolls out "smooth as silk."

The future of road building is going to call for a lot of blacktop. Plan to know all about the Adnun. If we can furnish literature or information that will help you, don't hesitate to ask for it.



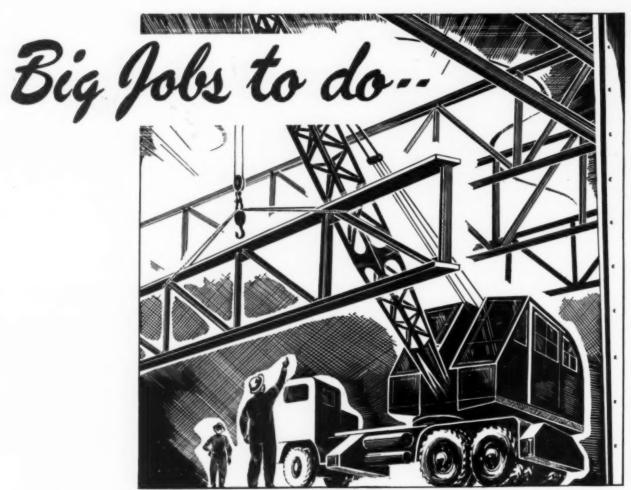
MULTIFOOTE

CONCRETE

BLACK TOP PAVER

THE FOOTE COMPANY, INC. New York Nunda

The World's Largest Exclusive Manufacturers of Concrete and Black Top Pavers

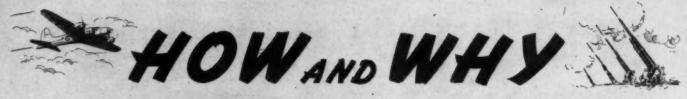


Calling for Mobility and Stamina.

Construction—earth moving—trenching—loading: these and countless other tasks are labeled, "NOW"! United Nations' engineers are winning lasting fame for "doing-the-impossible"—and along with other equipment the mighty MICHIGAN Dual Tandem-drive Crane is playing its part. Today, military battles are won by highly MOBILE units with STAMINA to give them staying power — the same two factors that have long been featured in MICHIGAN Shovels and Cranes. Fighters now, these MICHIGANS will be equally important in the vast peace-time construction program after V-day.

Write for Bulletin CM-73 and specifications.





WILLIAMS' TOOLS AID WAR PRODUCTION

"SUPERSOCKET"

Since socket wrenches, today, play an important part in the servicing as well as manufacture of mechanized war equipment, a general knowledge of standardized types is desirable. Williams' "Supersocket" Wrenches include 5 separate and distinct patterns of standard drive sockets, each with its full assortment of handles and parts. A brief description of each pattern follows, together with information on the type of service for which it is designed.

Midget Pattern

1/4" Square Drive. Openings, 3/16" to 7/16"



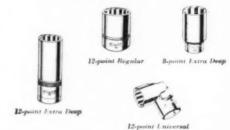




Slim, straight wall sockets for electrical and all delicate adjustments. Ideal for magnetos, timers, generators, wiring connections, radios, carburetors, etc.

Bantam Pattern

3/8" Square Drive. Openings, 1/4" to 3/4"



Light, but strong, straight wall sockets with thin walls for use in close quarters. Universal sockets are fitted with spring tension to maintain desired operating angle. Recommended for aviation and general service.



Standard Pattern 1/2" Square Drive. Openings, 7/16" to 1-1/4"







int Regular 12-point Extra Deep Square h

The 12-point sockets in this pattern have straight, thin walls. Those with square openings are the Taper Nose type. Extra Deep sockets have cross hole for use with a bar. Recommended for industrial and general service.

TYPICAL HANDLES & PARTS

Standard Pattern Illustrated



andles S51: Reversible Ratchet Handle saions S40, S41 & S42: Flex Handles S20A: Sliding T Handle sench" S1130: Adapter, S140: Univ. Join

Heavy Duty Pattern

3/4" Square Drive. Openings, 7/8" to 2-1/4"





12-point Regular

12-point Extra Deep

Designed for harder service where more strength is required than on the "everyday" job, this pattern provides ample strength without clumsy bulk.

Extra Heavy Duty Pattern

1" Square Drive. Openings, 1-1/16" to 2-3/4"

Ruggedly designed for the toughest kind of service. Sockets are all cross-drilled to receive sliding handle, which minimizes tendency of socket to "tip" under extreme leverage. "Lock-Socket" device eliminates danger of sockets being detached in service. Ideal for all



12-point Regular

extremely heavy work including tanks and other mechanical field equipment.

General Characteristics

Speed and Safety are inherent socket wrench advantages. "Supersockets", with their innumerable combinations of handles, accessories and drive adapters, provide an extremely flexible wrench system that is speeding war production and the servicing of fighting equipment for land, sea and air.

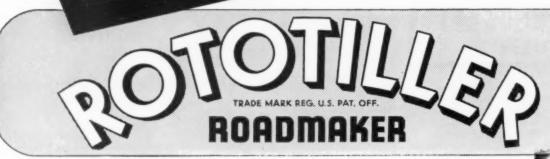
Williams' "Supersockets" are sold singly and in complete Sets. Write for booklet, "How to Select and Use Wrenches."



Sold by Leading Industrial Distributors Everywhere . . . J. H. Williams & Co., Buffalo, N. Y.

TOOL HOLDERS "C" CLAMPS LATHE DOGS WRENCHES OF ALL TYPES PIPE TONGS THUMB NUTS HOIST HOOKS EYE BOLTS SCREWS SCREWS OF ALL TYPES PIPE TONGS THUMB NUTS HOIST HOOKS EYE BOLTS OF ALL TYPES PIPE TONGS THUMB NUTS HOIST HOOKS EYE BOLTS OF ALL TYPES OF ALL TYP

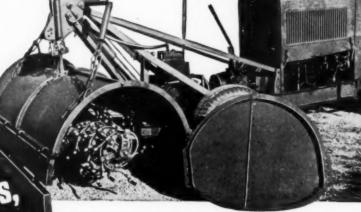




With IMPROVED Soil-Cement and Soil Stabilization Equipment

FOR BUILDING
HIGHWRYS, RUNWRYS,
FLIGHT STRIPS
Jaster, better!

Post war plans undoubtedly will call for thousands of miles of soil-cement and soil stabilized secondary roads. Returning soldiers will find economic security in this work. Then, as now, ROTOTILLER Roadmaker will serve faithfully and well.



BACK in the 30's this original "3-in-1" Rotary Action Tillage Machine was used on early experimental projects in soil-cement construction.

The landing fields and roads built then are still in use, in sound condition. They've taken the extremes of weather, the abuse of traffic. And each year since then ROTOTILLER Roadmaker has kept pace with developments in soil-cement and soil stabilization work by constant improvement in machine and method.

ROTOTILLER Roadmaker is engineered to exacting automotive standards. It is sturdy, powerful—ruggedly built to meet today's exacting war-time demands.

Contractors and engineers engaged in military construction are urged to get all the facts on this improved 1943 job-tested ROTOTILLER Roadmaker. Write for literature.

DEPT. M ROTOTILLER, INC. TROY, N.Y.

THE <u>OLD</u> AND THE <u>NEW</u> TEAM UP TO reed Drilli



"ARMORED IN PLASTIC"

With its unique plastic construction, this Thor U14K 1/4-inch portable electric drill is as new as tomorrow. Its features of lighter weight, more power per pound and new handling ease provide performance that meets the stiff demands of today's high speed, heavy duty production! And, beneath the plastic armor is the time-proven reliability of Thor construction: the Thor

Hevi-Duty motor with its great reserve of power, high torque and remarkable stamina. For every kind of heavy duty, 1/4-inch drilling, this teaming up of the old and the new gives unparalleled results. The Thor "Armored in Plastic" drill is available now to war industries. Write for circular giving full details.





PNEUMATIC TOOL COMPANY



600 W. JACKSON BOULEVARD, CHICAGO, SL. Branches in Principal Cities

July 1943 - CONSTRUCTION METHODS - Page 41

New Wire Rope Simplification Plan Welcomed by Users

In this, the 16th of a series of informative articles on wire rope, the Macubyte Wire Rope Company presents a condensed report of "Simplified Practice Recommendation R198-43." This sound and widely discussed plan was developed through the combined efforts of the National Bureau of Standards and engineers of the Wire Rope Industry. This timely information will be most useful to wire rope users.

sk # sk

For many years, both wire rope users and the wire rope industry have hoped for a reduction and simplification of the number of wire rope items. The wide variety of items was not only confusing to users, but also increased the problems of manufacturing and stocking so many different ropes.

Shortly after Pearl Harbor, it became obvious that both a steel and a manpower shortage would develop. Since reduction and simplification of wire ropes would help save steel, conserve time and manpower, and expedite deliveries, the Bureau of Standards worked out a

plan described in "Wire Rope Simplified Practice Recommendation R198-43." Copies may be obtained from the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. Price 10 cents. This plan is one which consumers, distributors and manufacturers have long wanted; not only as a wartime conservation measure, but as a basis for improved service afterwards.

What, briefly, is this simplification plan? How does it affect you?

The wire rope simplification program is concerned primarily with a reduction in the number of different sizes, varieties, and grades of wire rope produced for stock purposes.

Wire rope engineers working with the Bureau of Standards found that 20 wire rope constructions cover the vast majority of wire rope tonnage.

By adhering to these constructions, the number of ropes are reduced from 973 to 643, or 33.9%.

How Users Benefit

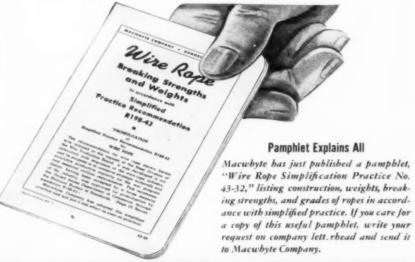
By reducing the number of "special" ropes, more attention can be paid to faster production of those ropes most widely used. Better service and delivery can be made to users as larger stocks will be available due to greater production of fewer items.

Your Cooperation

Hundreds of manufacturers, distributors, users, and all wire rope manufacturers have indicated in writing, their acceptance of this simplified wire rope practice which will result in increased efficiency for manufacturers, distributors and users...not only now but also in the post-war period.

Wire rope users can aid materially in the success of this program by voluntarily confining their specifications and orders, so far as possible, to the items recommended by the simplified practice program.







Mill Depots: New York · Pittsburgh · Chicago · Fort Worth · Portland · Seattle · San Francisco. Distributors throughout the U.S.A.

Manufacturers of MACWHYTE PREformed and Internally Lubricated Wire Rope MONARCH WHYTE STRAND Wire Rope

MACWHYTE Special Traction Elevator Rope MACWHYTE ATLAS Braided Wire Rope Slings MACWHYTE Aircraft Cables and Tie-Rods





Special baffle plates at skip sides protect paver and operator from cement sand and gravel.

Wide skip permits easy and quick spotting of loaded batch trucks.

EASY AND QUICK BATCH SPOTTING

High speed pouring requires high speed in every operation. Important operation in the batch cycle is the loading of the skip. Koehring Paver skips are large, streamlined, without corners, designed for flow-line charging, wide enough for easy entrance of batch truck tires. Skips have sufficient area to hold the maximum size batch without crowding. Heavy



Large skip area provides sufficient space, without crowding, for maximum batch.

plate construction with replaceable liners and tire tread plates assure a rigid unit for batch truck loading.

KOEHRING COMPANY MILWAUKEE - WISCONSIN



HEAVY-DUTY CONSTRUCTION EQUIPMENT

Any Way You Look At It It's the Buckeye 410"

Do you want speed? Maneuverability? Ease of handling? Low fuel consumption? Power to hog out trench in the toughest going? Maximum digging range in one machine? You'll be able to get them all in this fast, compact Buckeye ladder type trencher when we've knocked the hero out of Hirohito and the hit out of Hitler. Navy "Seabees" and army engineers are now using them for the preliminaries before the big bout.

The "410" digs clean trench 18" to 24" wide and up to 6' deep. Operates in space less than 8' wide; cutting feeds from 46/100' to 38' per minute; cutting speeds of 31' to 189' per minute. The all-around trencher for service pipe, water and gas mains, sewerage, airport and highway drainage. Plan ahead—send for Bulletin 45.







Buckeye Traction Ditcher Co., Findlay, Ohio

Buckeyer

CONVERTIBLE SHOVELS, TRENCHERS AND BACKFILLERS, TRACTOR EQUIPMENT, R-B FINEGRADERS, ROAD WIDENERS AND SPREADERS

















1. It takes teamwork to get convoys through! Wherever we send troops, supplies and vital war materiel, death, danger and destruction lie in wait. To overcome these obstacles requires careful planning and perfect teamwork between Army, Navy and Merchant Marine—our forces have it! They're doing their jobs with determination and courage—teaming-up to knock out the enemy wherever he may be.

2. M. A. Compton, President of the Compton Transfer & Storage Company, Boise, Idaho, whose firm handled two-and-one-half times as much gross volume in 1942 as in any previous year, without a single reportable accident or a single road failure, says—"Teamwork pays dividends in transportation, too. Teamwork between owners, drivers and mechanics is a MUST for achieving Victory on the transportation front."

TIMKEN HELPS YOU "KNOW HOW"



We take our hats off to the great American transportation industry for a job "Well Done." But the battle of transportation is far from over! Vehicles are getting older. Manpower is getting more scarce. So let Timken team-up with you and help you solve your problems. Let us show our full-color, sound slide film "TEAMWORK" to your entire organization. Get our complete set of driver and maintenance aids, free of charge. This program is widely followed by leading transportation companies and approved by ODT.

TIMKEN AXLES

THE TIMKEN-DETROIT AXLE CO., DETROIT, MICHIGAN WISCONSIN AXLE DIVISION, OSHKOSH, WISCONSIN

303 C We a	MKEN-DETROIT AXLE CO. grk Ave., Detroit, Mich. e interested in seeing the film "Teamwork." send complete driver and maintenance
Name (Num Addre	er of Employees)
	State



There are three forces constantly at work to destroy wire rope in use,—(1) wear, (2) fatigue and (3) corrosion. The use of LUBRIPLATE 130-AA as a wire rope lubricant has proven so effective in combatting them that rope manu-

facturers are recommending it for the toughest rope jobs.

LUBRIPLATE 130-AA has enormous film strength and adhesiveness. Hence it is not squeezed out under the terrific wire rope internal pressures. It is impervious to water, moisture and most industrial fumes. LUBRIPLATE therefore prevents rust and corrosion. By

doing a better lubrication job LUBRIPLATE permits the strands and wire to work with minimum friction which materially reduces one of the causes of wire fatigue.

These claims for LUBRIPLATE are backed

up by unsolicited testimonials of wire rope users who say that it has licked their wire rope problem. LUBRIPLATE lubricants range from the lightest oils to the heaviest greases. Each is an outstanding lubricant that will do a specific job better. Let us send you facts and figures about LUBRIPLATE lubricants. Write today.



LUBRIPLATE DIVISION

FISKE BROTHERS REFINING COMPANY

SINCE 1870

TOLEDO, O.

WRITE FOR THE NAME OF THE DEALER NEAR YOU

That lead to big dragtime output In addition to such major factors in dragline output as job layout, operator's skill, careful lubrication, proper clutch and brake adjustment, etc., a host of details can swell the production record. Here are just a few: 3 Watch fairlead. Bucyrus-Erie employees have accepted the award of the Army-Navy "E" as a challenge to keep production rising. * *

MILWAUKEE

ONSIN

I S C

The tire to beat "general" mud

UD and marsh can do just as much to slow down war jobs behind the lines as they can to halt the advance of an army. In fact mud, soft ground, hard rock (yes, and, in season, snow) can mean the difference between a smooth-running job and one which bogs down into a contractor's headache.

That's why Goodyear has spent years developing off-the-road tires to supply greater traction, more speed, more pull. At right is pictured the Goodyear Sure-Grip for mud and marsh. Below you see the Goodyear Hard Rock Lug for rock work, and the Goodyear All-Weather Earth Mover for drawn dirt-movers.

Each of these tires, in addition to having a tread designed for a particular terrain problem, has the multiple-compound construction and low stretch Supertwist cord carcass which give Goodyear off-the-road tires the heart to take the toughest punishment.

All Goodyears, of course, are built with the maximum amount of new live rubber allowed by government specifications for tires to be used on essential wartime construction projects.

So play safe with that important contract. Use your tire certificate to invest in Good-



years. They'll do the job for you. After all, it's a fact in the tire business - has been for more than twenty years - that

more tons are bauled on Goodyear truck tires than on any other kind.

"MUST" READING FOR WARTIME CONTRACTORS Send for Free Copy

odyear's Off-the-Road Tire manual has just what you need to know about getting the most wear out of your tires. To get your free copy of this fact-jammed service handbook on proper tire care and maintenance, write Dept. SP, Akron, Ohio.

Goodyear's new sound slide film on truck tire conservation is available for showings to group meetings of your drivers and maintenance men. Your Goodyear dealer or serviceman will be delighted to show it to your employes. Ask him

THE GREATEST NAME IN RUBBER

HARD ROCK LUG

GOODYEAR ALL-WEATHER EARTH MOVER for drawn dirt-movers

Page 48 - CONSTRUCTION METHODS - July 1943

Construction Methods

ROBERT K. TOMLIN, Editor

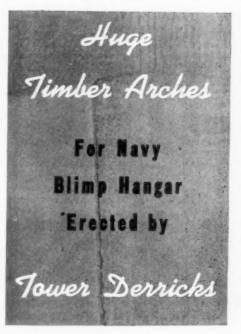
Volume 24

JULY, 1943

A PAIR OF STIFF-LEG DERRICKS

mounted atop 145-ft.-high steel traveling towers of triangular shape constituted the key items of equipment employed by the Phoenix Bridge Co., under a subcontract with Karno-Smith Co. of Trenton, N. J., and Duffy Construction Co. of New York, general contractors, for erecting timber arches of 246-ft, span for a huge blimp hangar at a Naval Air Station on the Eastern Seaboard. The hangar measures 1,058x296.5 ft. in plan and the 51 timber arch trusses, spaced 20 ft. on centers, forming the structures, are 170 ft. above ground at their crowns. Each arch truss is pre-assembled on the ground in four segments with the aid of Teco timber connectors. All structural timber and roof sheathing is pressuretreated with a mixture of ammonium and boron chemicals to make it flame-Wood members for the trusses were accurately pre-cut to specified dimensions by Timber Structures, Inc., and shipped to the job from the West Coast.

The arch erection scheme involves the



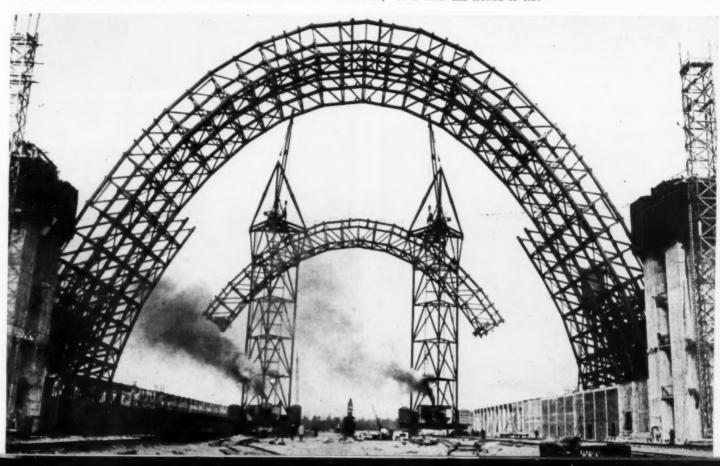
raising of "braced bays," consisting of pairs of similar segments of the foursection arch ring framed and braced into an assembly 20 ft. wide. The four segments forming each arch include two bottom units of 8 panels each and two top units of 10 panels each. The arch trusses are connected at panel points by 3x12-in. purlins and diagonal bracing.

Each of the two tower derricks travels on tracks set 60 ft. out from and on each side of the center line of the hangar. Booms of the Clyde stiff-leg derricks are 75 ft. long and the lifting capacity is from 21 to 40 tons, depending on the operating radius of the boom.

Each arch truss is fabricated in four segments at an assembly yard commanded by a guyed derrick with 100-ft. boom. On two layout tables, one for the top and the other for the bottom segment of each arch, precut wood members, with bolt holes bored at proper points, are formed into bolted truss units with the aid of timber connectors. The arch seg-

(Continued on page 110)

STIFF-LEG DERRICKS (below) with 75-ft. booms atop traveling steel towers 145 ft. high erect pre-assembled sections of timber arch trusses of 246-ft. span and 170-ft. rise. Tower derricks, mounted on wheels, move on pairs of railroad tracks to swing arch sections into position for bolting by riggers. Each arch truss is fabricated in four sections. Two similar arch sections are formed into "braced bay" 20 ft. wide and erected as unit.



THIS MONTH'S NEWS REEL

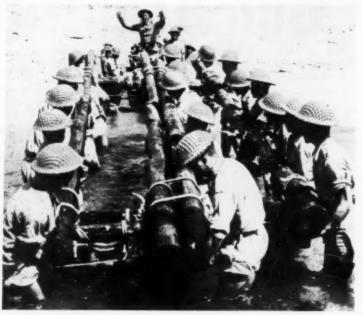


CONSTRUCTORS CONFER with Army Engineer Corps chief on drive to recruit 100,000 construction men for overseas service, which was launched at dinner sponsored by construction industry in New York City June 3. At speakers' table are, left to right, OSCAR B. COBLENTZ, president, Associated General Contractors of America, and president of McLean Contracting Co., Baltimore, Md.: MAJOR GENERAL EUGENE REYBOLD, Chief of Engineers; and J. P. H. PERRY, vice president Turner Construction Co., New York, chairman of Dinner Committee.

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MARINES IN JEEP (below) and load of gravel pass on bridge spanning Matanikau River in Gaudalcanal on one side of main supply lines to front.





CHINESE EXPEDITIONARY FORCE ENGINEERS bridge stream during first big full-dress field maneuvers at American training center somewhere in India. Center span is maneuvered into position under direction of CAPTAIN SUN.



TO RESTORE FLOW OF OIL from Texas to eastern United States, "Big Inch" emergency line, following break caused by mid-western floods, is laid along bank of Arkansas River in search of safe temporary crossing.

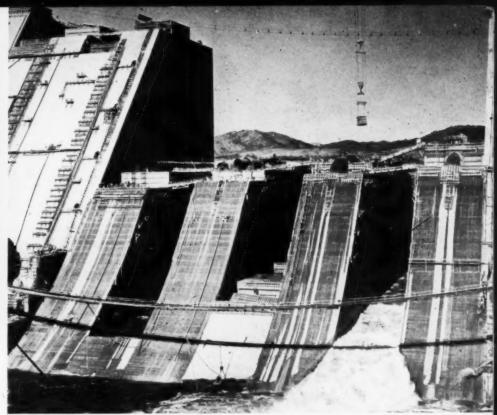
WIDE WORLD PHOTO





DENVER H. SPANN hammers home 363.8 %-in. rivets an hour as captain of five-man team that set new world's riveting record at Los Angeles Shipbuilding Corp. yards. Two contesting teams drove 4,002 rivets in $5\frac{1}{2}$ hr., with faster team finishing 6 min. ahead of runner-up.

ACME PHOTO



PREFAI

NINE CHINESE ENGINEERS study American engineering methods in Tennessee Valley. Eight are assigned to various TVA projects and ninth is assigned to Chattanooga war plant. Photographed with Van Court Hare, TVA engineer, while meeting to exchange information and experiences are,

REPAIR CREWS fill holes in road to accommodate heavy truck and tank traffic during advance of American armored forces in El Guettar Valley in Tunisia.

left to right, PAO-FU CHU, P.H. CHAO, WILLIAM L. C. HUI, EN-YING YUI, Mr. HARE, H.S. SZE, MIN JEN PU, WEN-HSIU WANG, P. Y. YANG, and PEI-HOU SHIEH. They are part of group of 35 sent here by National Resources Planning Commission of China.

PREFABRICATED SECTIONS (below) for three defense housing projects at Bremerton, Wash., come off production lines at Seattle plant of Prefabricated Products Co. Jig tables, running parallel to each other length of plant, permit performance of every prefabrication operation in entire house. Interiors of outside walls and interior wall partitions are of Speedwall board glued to studding with Laucks construction glues.

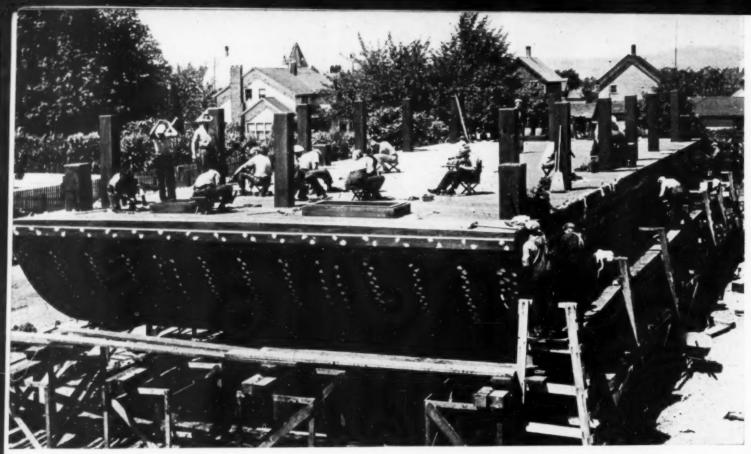
EIGHTY PERCENT COMPLETED, construction continues unabated at Shasta Dam, U. S. Bureau of Reclamation project in California. With more than 5,000,000 cu. yd. of concrete placed in structure, about 1,500,000 yd. are yet to be poured. Detailed

view of spillway section shows general operations and installation of four 102-in. permanent river outlets. River is temporarily diverted through Row 40 while concreting on remaining blocks is carried on by Pacific Constructors, Inc.





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AS BARGE NEARS COMPLETION, white spots mark waterproof cement applied to fill holes in which bolt heads are countersunk.

Wood Barges BUILT IN 72 HOURS TO CARRY WAR FREIGHT IN COASTAL SERVICE





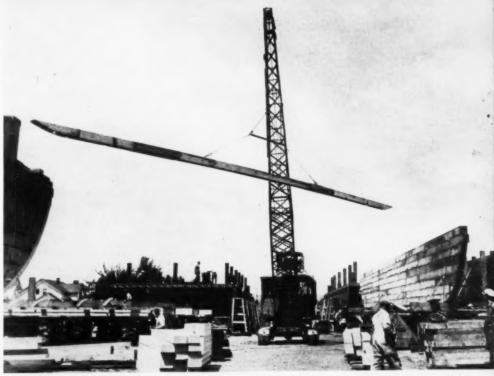
BOLTING UP JOINTS (left) in pair of heavy timbers is done with aid of chain jacks which hold timbers together while bolts are put in.

COMPLETED ASSEMBLIES for keel of barge are turned over with crane. Barges are designed to carry up to 1,940 tons.

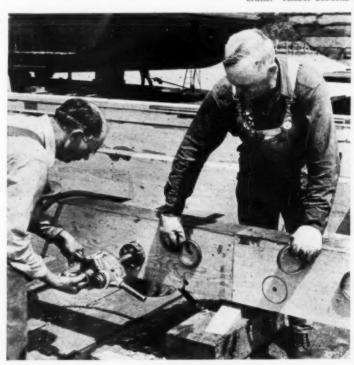
Page 52 - CONSTRUCTION METHODS - July 1943

in the pacific northwest timber is plentiful and now that there is a high premium on bottoms in which to ship freight for war activities along the Coast and especially into the Alaskan area, there is much activity in the construction of timber barges to be towed by tugs, thus releasing from coastwise runs freighters needed for overseas service. In general, the requirements are that the barges be of very sturdy construction and that they be built with a minimum of critical material. Construction must be entirely of timber except for necessary spikes, bolts and ring connectors.

The accompanying pictures, typical of barge construction activity that has been greatly stimulated, show successive steps in the assembly of barges designed to carry as much as 1,940 tons. This series of pictures comes from the plant of the Ultican Shipbuilding Co., where two sizes of barges are being built. Crane barges are 140 ft. long, with beam and draft of 55 and 10 ft., respectively. They call for 350,000 b.ft. of timber and are designed for a maximum load of 1,940 tons. The more numerous freight barges



THIS FULL-LENGTH TIMBER has two joints. Note very slight deflection as it is being handled by crawler crane. Timber sections as large as 10x30 or 18x26 in. are used in barges.



GROOVES ARE CUT for split-ring connectors (left) at scab joint. With rings in place (right), first scab is being put on. Note toe nails in foreground to hold scab while bolts are being placed.

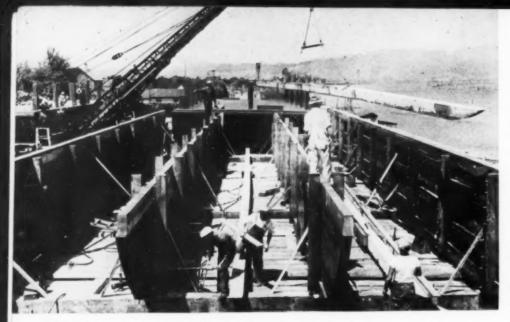




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WOOD BARGES (below) of two sizes are assembled on dock which has launching skids extending into water.





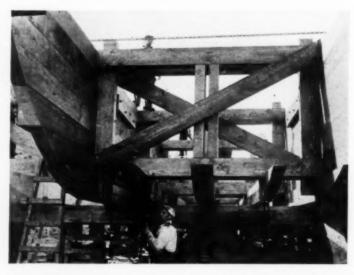
LONG TIMBER is swung into place on barge by boom of crawler crane.

(70 are under contract at this one plant) have dimensions of 110x34x8 ft., call for 125,000 b.ft. of timber and carry a maximum pay load of 650 tons.

Essentially, these barges consist of longitudinal runs of heavy timbers with substantial cross-bracing at frequent intervals and with all seams in hull and deck thoroughly calked and tarred. Exterior bolt heads are countersunk and after the bolts are in place the spaces around the heads are filled with waterproof cement. The timbers themselves, prior to being put together in the assembly, are sprayed with a copper solution to retard dry rot and decay. Timber sections as large as 10x30 in. or 18x26 in. are used and long runs of 12x12s or 16x16s are not uncommon. The fabrication of one of these barges can be completed in 48 hr. and, subsequently, assembly can be completed in 24 hr. more.



DECKING IS SPIKED and bolted down with power-operated equipment. Note wedges to draw joints tight.



INNER BRACES and cross members give strength and sturdiness to wood barge. A minimum of critical material is used.

CALKING OF SEAMS (below) in bow calls for experts. Joints must be perfectly tight.



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"I may be a little late tonight, dear. We're drawing up a few plans."

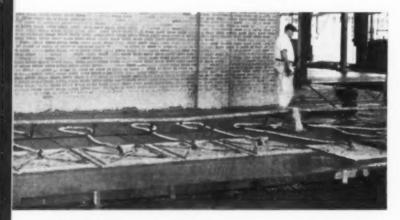


"I said, 'Look at the big fat slab.' What did you think I said, Inspector?"



"An' how's everything way out there in Californy?"

TWO-MAN ROLLER SCREED made out of 22-ft. length of 4-in. pipe facilitates operation of striking off concrete deposited by hand carts in 20-ft. lanes between screed boards and provides improved compaction of concrete for easier finishing after slab has been vacuum processed.



VACUUM MATS connected by hose line to pipe manifold remove excess water from concrete and produce necessary consolidation to permit immediate operation of power floats on slab surface.

POWER FLOAT (below) driven by gasoline engine mounted above rotary disk of Kelley machine gives initial finish to surface of vacuum-processed concrete slab placed in 20-ft. lane adjacent to brick fire wall separating storage sections of typical timber-frame warehouse at large naval supply depot. Initial floating is followed by mechanical troweling with rotary trowel.



Vacuum Removal of Excess Water

Hastens Concrete Floor Finishing With Power Floats and Trowels

BY EQUIPPING a \$45,000,000 naval supply depot project involving 7,000,000 sq.ft. of monolithic concrete floor slab for the Bureau of Yards and Docks of the Navy Department with vacuum processing apparatus and power-driven rotary floats and trowels, the contractors were able to complete from 20,000 to 94,000 sq.ft. in a 10-hr. day with two crews, each employing about 18 finishers for screeding, operation of power machines and hand troweling. Rapid removal of excess water from the concrete slab by means of vacuum mats permitted the power floats and trowels to start machine finishing of the surface soon after the concrete had been struck off, and this acceleration of the finishing operation allowed concrete placing to continue until the end of the eighth hour in a 10-hr. day without requiring overtime work on the part of the finishers. No dust coat was applied to the surface, but the job specifications required that the concrete be given a hard troweling by hand following the use of the power machines.

In most of the storehouses on this Navy project, which was described in Construction Methods, June, 1943, p. 56, columns are spaced on 20-ft. centers in both directions, and a 5-in. mesh-reinforced concrete slab was placed on natural earth grade in 20-ft. lanes between the column rows across the 200-ft. width of the buildings. A roller screed developed on the job both reduced the labor of striking off the concrete and facilitated the work of finishing. The roller screed consisted of a 22-ft. length of 4-in. pipe fitted at both ends with steel handles attached to hubs on the central axis of the pipe. By

ROTARY TROWEL (below) driven by compact gasoline engine of Whiteman finisher operates over floated surface of concrete slab to produce smooth mortar coat for final finish. Final hard trowelling of monolithic floor finish is applied by hand, as required by project specifications. Hand finishers make good use of mortar coat produced by power floats and rotary trowels.





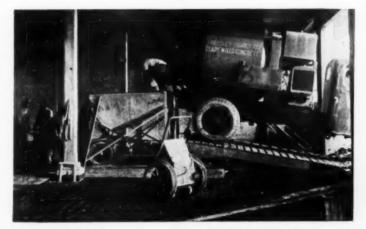
FORTABLE SPRAY CURING OUTFIT applies film of liquid sealing compound which rapidly hardens into transparent, impervious membrane.

means of these handles, two workmen could either pull or push the roller screed along the screed boards on which it rested. With this implement, two men could strike off the concrete more easily than could a large number with a conventional manually operated strike-off screed. In addition, the foremen in charge of the floor crews asserted that concrete struck off and compacted by the roller screed was easier to finish.

Water Removal-Concrete, mixed and delivered by truck mixers, was wheeled and dumped into place with hand carts to be spread with hand shovels for striking off by the roller screed. Designed for a minimum compressive strength of 2,500 lb. in 28 days, the concrete had a cement content of 4.6 sacks per cu. yd. and a total water content of 10 gal. per sack. In line with a rule-of-thumb formula commonly applicable to vacuum processing of ordinary concrete, the vacuum mats were kept in operation on the slab about 1 min. for each inch of depth, a total of 4 or 5 min. for the 5-in. thickness. According to measured quantities of water trapped in the replaceable drums at the vacuum pumps, the vacuum process applied for this average period removed 12 to 17.5 percent of the moisture from the concrete, or 5.4 to 8.1 gal. per cu.yd. This removal of excess water with accompanying consolidation allowed the power floats to be operated on the surface immediately.

(Continued on page 116)





PORTABLE RAMP elevates rear end of truck-mixer to discharge concrete into floor hopper which fills hand buggies transporting concrete to paving area.

Calling All Construction Workers

Army Engineers Launch Giant Recruiting Drive For 100,000 Specialists

WANTED: 100,000 CONSTRUCTION MEN to build and fight for the Army Engineer Corps.

This is the goal of the recruiting campaign now under way to obtain mechanics and technicians for general service regiments, aviation engineer battalions, combat engineer battalions, bridge and ponton units, water supply units and other outfits that call for specialized skills.

To give impetus to this drive, New York's construction industry sponsored a dinner at the Hotel Commodore on June 3.



MAJOR GENERAL EUGENE REYBOLD. Chief of Engineers, U. S. Army, calls on construction industry to support recruiting drive which has 100,000 Engineer Corps enlistments as objective.

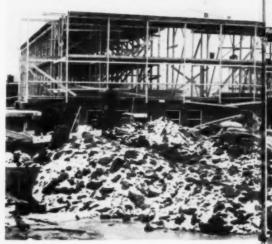
Major General Eugene Reybold, Chief of Engineers, outlined the new program under which voluntary enlistments of construction men, equipment operators and engineer specialists will be accepted prior to their induction by selective service. Predicting a change in emphasis in the Army's construction program, which will mean a sharp decline in activities at home, he declared that the bulk of construction operations is being transferred to foreign shores. Most of it must be done by troop units whose skilled workers and officers are drawn in large numbers from the ranks of the construction industry.

"Airdromes must be built all over the world, streams bridged to bear the advancing arms and armies of Democracy, roads constructed, water facilities provided, storage and repair depots raised, port and harbor facilities improved, mine fields and entanglements cleared for the advance of our troops, obstacles set in the path of the enemy—a thousand jobs that call for the type of specialists with which you have been working," General Reybold told the 1,500 construction men present.

(Continued on page 112)



TEN-UNIT DESIGN for Arlington Forms dormitories provides outside exposure for all rooms. Living quarters are served by "civic center," comprising cafeteria, recreation building, canteen, administration and post office building.





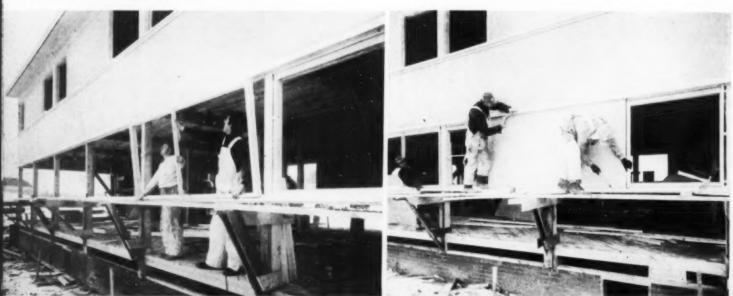
Two-Story Dormitories

Built of Wood Frames and
Large-Size Fiber-Board Panels
to House Washington's
"Government Girls"

TEN BIG DORMITORIES to house 7,000 "Government girls" are being constructed by the Public Buildings Administration at Arlington Farms, on the outskirts of the District of Columbia, to form the largest of six similar projects planned to relieve 15,000 women holding Federal jobs of the struggle of finding living accommodations in over-crowded Washington. Buildings on the \$7,500,000 project are of wood-frame construction, two stories in height, with outer walls of Cemesto fiber-board panels, product of the Celotex Corp. These panels, each 4 ft. wide and up to 12 ft. long, provide a complete wall, including exterior and interior finish, plus insulation against heat and cold. The units, 1 9/16 in. thick, are composed of bagasse, a cane-fiber insulating core, sealed with special asphaltic compounds between layers of weather, fire and wear-resistant asbestos cement. The installation is in accordance with the system of construction of the John B. Pierce Foundation, of New York, of which J. F. O'Brien is general manager.

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WALL CONSTRUCTION (left and right, below) involves use of timber studs, frames that allow window sash to slide sideways, and panels of Cemesto fiber-board 4 ft. wide and up to 12 ft. long.





WOOD FRAMES for two-story dormitory units, each accommodating from 600 to 700 Government employees, rise above brick masonry foundation walls.



SINGLE-ROOM UNITS for occupancy by girls in Government employ have dimensions of 8×10 ft. and rent for \$24.50 monthly.

Ceilings are of fiber-board, covered with fire-resistant paint, and all rooms are surrounded by fire stops built into the floors, which are of double construction, finished off in solid oak. To save war-necessary material and give maximum ventilation, windows of wood sash slide horizontally to permit the entire opening to be free.

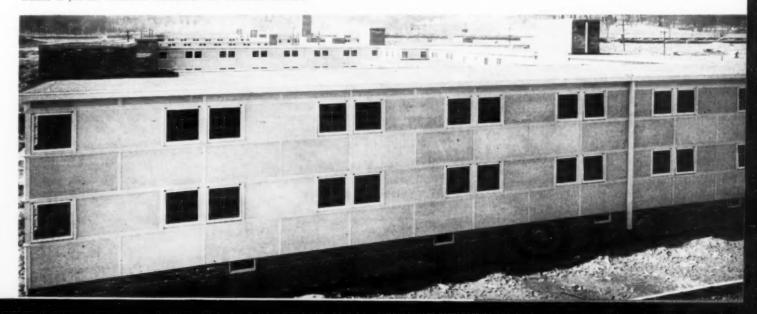
The Arlington project, within walking distance of the War Department's huge Pentagon Building, providing office quarters for thousands of government employees, comprises ten dormitory units, each accommodating from 600 to 700 women, in addition to a "civic center" where are located a cafeteria, recreation building, canteen, and administration building. The majority of the dormitory units are single rooms, 8x10 ft. in size, renting for \$24.50 per month. Girls eligible for quarters are limited to the \$1200-\$1800 income group, to those who arrived in Washington after July 1, 1941, and to those who live beyond reasonable commuting distance.



LARGE SIZE FIBER-BOARD PANELS for exterior walls of dormitories are 1 9/16 in, thick and provide insulation against heat and cold. Core is sealed with asphaltic compounds between layers of asbestoscement as protection against fire, weather and wear.

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COMPLETED DORMITORY UNIT (below) is of two-story wood-frame construction with walls of insulating fiber-board and windows that slide sideways in wood frames to provide maximum ventilation with minimum material.



WESTERN PENNSYLVANIA CONSTRUCTORS SPUR PRE-PLANNING FOR Post-War Public Works

CONDITIONS QUITE DIFFERENT from those facing the Turner Construction Co., a contractor for private owners, as noted in the May issue of Construction Methods, confront the members of the Constructors Association of Western Pennsylvania in developing future business to assure full employment of construction personnel in the post-war period. Heavy construction is the branch in which the members operate, and the bulk of this class of construction, after the war, will continue to be built as public works rather than as privately-owned works. For the main volume of their business, therefore, the contractor members must rely on projects built with public funds.

Originating Public Works Programs

Planning for this kind of projects ordinarily cannot be stimulated or properly influenced by individual concerns. Sound public works programs must be initiated by public bodies or large groups of public-spirited citizens. Contractors, as beneficiaries of such programs, have no proper place in instigating or fostering public demand for them. United in organizations like the Constructors Association of Western Pennsylvania, an affiliated chapter of the Associated General Contractors of America, they can proffer advice when it is requested and they can properly join with larger groups, such as the Chamber of Commerce, in advocating and supporting needed, economically feasible public works.

These considerations form the underlying philosophy of the Constructors Association with respect to initiating or promoting proposed public works programs. Once public works projects have been approved and authorized by the responsible public body (Congress, state

By VINCENT B. SMITH Associate Editor Construction Methods

legislature, county commissioners or city council) the contractor group, through committees and through individual members, is free to exert a more direct influence in urging the authorizing body, or the engineering department to which planning is delegated, to begin promptly the preparation of complete contract drawings and specifications in order that bids may be taken and construction started as soon as the opportune moment arrives. This latter function of the association is the one to which the group's Pre-Planning Committee is now directing its efforts. As appointed by President Samuel L. Fuller, of the John F. Casey Co., Pittsburgh, the members of the association's Pre-Planning Committee are: William F. McCrady, McCrady Construction Co., Pittsburgh, chairman; A. J. Ackerman, Dravo Corp., Pittsburgh; Joseph Cohan, Holmes Construction Co., Wooster, Ohio; B. C. Coit, Tri-State En-

How group effort by contractors, through Pre-Planning Committee, is being organized and directed to provide employment on peace-time construction program gineering Co., Washington, Pa.; and John W. Eichleay, Eichleay Engineering Co., Pittsburgh.

Two requisites are essential to the successful operation of a constructors' association, as any one who has participated in the work of such a group will attest. First, the association must comprise contractor members who recognize the need of group activity to solve common problems of competing concerns engaged in the same field of business. With this recognition of the need must be present also the imagination, analytical ability, cooperative spirit, and enterprise to grasp the problems, tear them apart, produce workable solutions and activate the decisions finally arrived at. These qualities usually, but not always, may be assumed from the fact that contractors have formed an association and have continued to pay their membership assessments. It can be said without fear of contradiction that the Constructors Association of Western Pennsylvania contains the requisite abilities.

Secretary's Role Important

The second requirement for successful association work is a capable and energetic executive secretary. The paid executive secretary, or manager, is the cohesive and energizing agent who centralizes and vitalizes all association activities. He not only is the channel through which all group effort flows, but he also is the pump which keeps the flow in motion. As a full-time servant of the group, he has an opportunity to sample the varied opinions of all the members and quietly offer to the elected officers and committee members proposals which will meet the approval of all. These qualifications are basic in the equipment of a secretary-manager, but they are only part

of the full quota of capacities that he can employ to the advantage of the group. The Constructors Association of Western Pennsylvania is strengthened in its work by having an executive secretary, Roy A. MacGregor, who measures up to all requirements. He has been on the job since the inception of the association in 1934, and before that time he had served for 16 years as district manager at Pittsburgh for the Lakewood Engineering Co. and the Jaeger Machine Co., after the latter had absorbed Lakewood. His familiarity with construction and with district conditions fit him to be especially valuable in his work for the contractors.

Post-War Business Planning

In company with all other association activities, efforts toward development of post-war business funnel through the executive secretary, who is largely responsible for giving impetus to these efforts. Development of local post-war programs in the operating region of the contractor members is the direct function of the Constructors Association, but local efforts must be integrated with the broader post-war program of the Associated General Contractors, which addresses itself to the future of construction on a national scale. Western Pennsylvania chapter members, in the large sense, have no greater opportunity than other chapters to align their post-war activities with the national program, as all have an equal voice in determining policy and all are kept equally informed of AGC studies and proposals. But in a special sense the Pittsburgh chapter has a direct tie with the national effort in that Roy MacGregor

sits as chairman on the five-man secretary-managers post-war planning committee of the AGC.

Membership of the AGC committee is diversified both geographically and with respect to types of construction repre-Mr. MacGregor represents a heavy construction chapter. Other members are Frank J. Connolly, Los Angeles, representing both building and heavy construction; Frank Conner, Charlotte, N. C., building and heavy construction; Ralph McMullen, Detroit, building; and C. O. Holmes, Indianapolis, building. The primary purpose of this committee is to develop means of making effective through the local chapters the program worked out by the AGC's Market Development Committee, of which Fred I. Rowe, of the W. L. Johnson Construction Co., Hicksville, Ohio, is chairman.

Post-War Prospects

Prospects for post-war public works in Western Pennsylvania are good. Through no planning on anybody's part, but merely through fortuitous circumstances. the State Department of Highways has accumulated a reservoir of about \$100,-000,000 of projects earmarked for construction. In 1942, Government orders stopped work on jobs then being initiated, leaving \$25,000,000 of construction to be completed in that program. To this sum can be added the postponed programs of 1943 and 1944, summing up to about \$100,000,000. Projects designated in the 1943 and 1944 programs can be brought to the bidding stage by three months' engineering work. The state has



PENNSYLVANIA TURNPIKE PROJECT, \$61,000,000 superhighway 161 mi. long between Pittsburgh and Harrisburg, was scene of construction activity by many members of Constructors Association of Western Pennsylvania. Here on L. M. Hutchison contract, grading is being done with 12-yd. Hell scrapers operated by 95-hp. Cletrac diesel tractors.



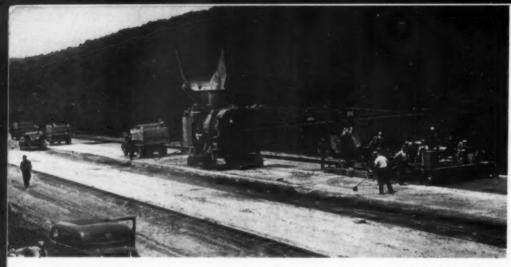
EXECUTIVE SECRETARY of Constructors Association of Western Pennsylvania is ROY A. MacGREGOR who has served with organization since it was formed in 1934.



PRESIDENT OF CONSTRUCTORS ASSOCIA-TION of Western Pennsylvania is SAMUEL L. FULLER, vice president of John F. Casey Co., Pittsburgh.



PRE-PLANNING COMMITTEE CHAIRMAN is WILLIAM F. McCRADY, past president of Constructors Association and president of McCrady Construction Co., Pittsburgh.



PAYING CONTRACT on Pennsylvania Turnpike, calling for four 12-ft. concrete lanes 9 in. thick, is scene of operation of 34E dual-drum mixer by crew of W. L. Johnson Construction Co., Hicksville, Ohio.



SIXTEEN SHIPWAYS (below) for Bethlehem-Fairfield yards at Baltimore, Md., were rushed to completion by Booth & Flinn Co., Pittsburgh, contractor, employing 2,500 workers on three-shift-per-day schedule.



ample highway funds to undertake the big program.

Numerous public works projects have been authorized by counties and municipalities of Western Pennsylvania. As the outstanding example, the County Commissioners of Allegheny County and the City Council of its chief city, Pittsburgh, have taken favorable action on projects which, with federal work authorized by Congress for the district, totals roughly another \$100,000,000. A first objective for the constructors' Pre-Planning Committee at present is to stimulate Allegheny County to begin prompt preparation of complete plans and specifications for projects already approved. county is in sound condition to finance the construction of these works. Although the credit position of the city is not so favorable, it has good prospects of being able to finance contemplated projects two years from now.

Total membership of the Constructors Association of Western Pennsylvania is 99, of whom about 60 are resident firms with headquarters in the district. The remainder are firms with main offices outside the district; these firms have built projects in the area within recent years. In common with most contractors who enter the district from the outside to perform work, they promptly joined the local association in order to participate in its obvious benefits. Credits carried over from their association assessments while they were active in the area will maintain these non-resident contractors as paid-up members for several years.

Necessary Construction Volume

To maintain normal construction employment by the resident members in peace-time years, an annual volume in heavy engineering construction of about \$20,000,000 probably would suffice. If greater employment is to be provided for workers in the post-war period, as proposed for all industries by far-seeing industrial groups like the Committee for Economic Development, a larger volume of construction, ranging from \$25,000,000 to \$30,000,000 per year, would be needed by the heavy constructors of Western Pennsylvania. Even under the latter condition, proposed work now on the boards seems ample to provide the necessary employment.

In line with the policy of the national AGC, the local association is advocating that only those public works be built which are demonstrably necessary, wealth-creating and wealth-producing. Marginal projects of questionable or doubtful value are rejected. In addition to these basic standards for approval, the association exerts its influence in favor of sound engineering planning and contract construction by competitive bidding. The present need in this area is to see that the sound engineering planning is not too long postponed, as the projects, if they are to be utilized effectively for maintaining employment at the close of

the war, must be ready at that time for immediate taking of bids.

The Constructors Association of Western Pennsylvania has long been noted for its successful relations with labor unions. By its frank and reasonable dealings with local unions, the association and its member firms have won the respect and cooperation of the unions, their leaders and their membership. A large share of the credit for this happy situation goes to the unions and the union leaders. On their side, the union leaders have shown the same frank and reasonable attitude. and their spirit and dependability have gained for them the respect and admiration of the contractors. Out of the mutual confidence thus engendered grew the closed-shop agreement of 1939 with the four unions which supply nearly all the labor employed on the jobs of the member contractors. The four unions are the hoisting engineers, carpenters, truck drivers and laborers. This agreement was described in Construction Methods, February, 1940, p. 38. A cooperative spirit based on mutual respect and trust has maintained this agreement and renewed or modified it when necessary to this day.

No program affecting the future wellbeing of the union members is undertaken by the constructors without the full knowledge and advice of the union leaders. An example is the accident prevention work of the association. Hunter P. Wharton, head business agent of the



RAILROAD CONSTRUCTION for B.&O. in mountainous territory of Somerset County, Pennsylvania, is handled by George Vang, Inc., here shown building heavy concrete retaining wall.

hoisting engineers union, is an associate member of the accident prevention committee of the Constructors Association.

Development of post-war business to assure full employment of construction personnel is a matter of grave concern to the unions. The association solicits and receives the advice of the union leaders before taking any steps in its post-war program, and, after decisions have been made and put into effect, they re-

ceive the full support of the union membership. This cooperation goes a long way towards assuring the success of any plans undertaken.

To ascertain the proportion of construction done by contractor members for private owners, the head of a representative concern was asked how his construction business was distributed in a normal peace-time year. Rejecting the last ten

(Continued on page 124)

HEAVY CONSTRUCTION (below) is specialty of Dravo Corp., of Pittsburgh, member of Association. Here concrete is being placed for Mahoning Dam, a U. S. Engineer Department flood control project located 50 mi. northeast of Pittsburgh, Pa. Structure 200 ft. high involved 250,000 cu. yd. of excavation and 346,000 cu. yd. of excavation and 346,000 cu.



Drafting Room Gremlins



BLAME THE DAMPIES for bulges and hummocks that appear overnight in tracings left securely tacked down.

PESTER ENGINEERS WITH PUCKISH PRANKS

By ROBERT ALLEN WARD

Assistant Subway Designer
Chicago Department of Subways and Superhighways
(now Lieutenant (j.g.), U. S. Naval Reserve)

THE R.A.F. focused world attention on the nefarious activities of those wacky little fellows, the Gremlins, but every draftsman knows that they or their American cousins, the genus *Gremlin Americanus*, have been active in the drafting room for many years. All of us, for example, are well acquainted with "Damp-

ies," charming chaps who creep into the drafting room late at night and scurry around putting bulges and hummocks in all tracings left tacked down so tightly the night before.

Then there is the gay little Gremlin who accompanies the Dampy on his nightly rounds. He carefully empties ink

INVISIBLE, even to experienced draftsmen (below), are Gremlins which swarm on ceiling and hide beneath desks in typical drafting room. Snarf may be perched on shoulder of man in foreground.



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bottles and sometimes even carries them from one drawer to another. Occasionally he varies this procedure by sealing the bottle with an invisible substance, so that when the hapless draftsman tries to fill his pen next morning the cork breaks off quite neatly instead of coming out. Although one of the commonest of all Gremlins, he is so unspeakable that he has never been named.

We all know, too, the "Pfft," a nasty lad. His delight is to perch on the end of ruling pens, and by blowing lustily, see to it that the ink is quite hard and dry as soon as the draftsman finishes one line and is ready to start another one.

One of the most malignant types of drafting-room Gremlins concerns himself solely with sketches of the utmost importance. Stealing into the drafting room during slack periods, he quietly gathers up these drawings and whisks them off to his lair where he consumes them in idle moments. Consequently, when the Boss calls for one of these sketches, it is no where to be found.

There are many other varieties of these interestingly obnoxious little people. Whole legions of them maintain their place in Gremlin society by breaking pen-

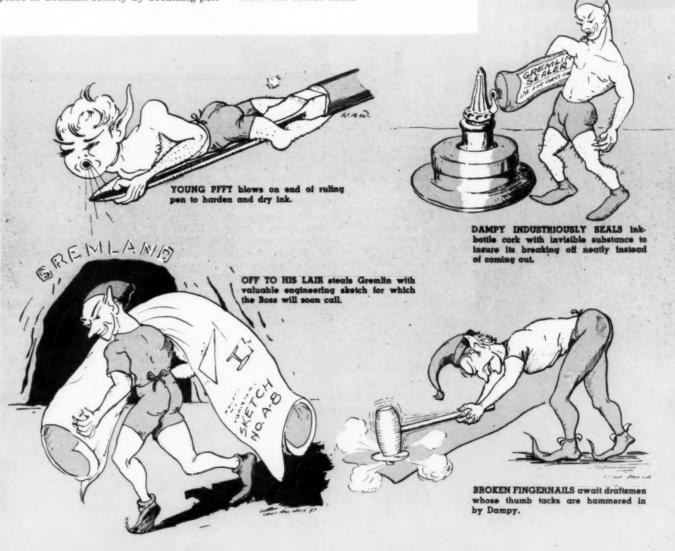
cil leads at particularly critical moments. Others are kept busy from dawn 'til dark hammering in thumb tacks so tightly that the hapless draftsman breaks his fingernail trying to pull them out. Still others quickly grind off the points of lead in compasses or, if no compasses are about, slither quickly over a tracing, smearing all places where the ink remains wet.

The "Snarf," a leering little goon, devours erasing shields and hides triangles or scales under deep piles of blue prints, usually on someone else's table. On sunny days several Solar Gremlins are usually at hand to pull out window shades just far enough to let a brilliant shaft of sunlight fall on the point where the draftsman is working at the time. Some Gremlins insert thumb tacks in elbows, others throw whole boxes of rubber bands out the window, while still others—hundreds of them—do nothing but mis-file valuable documents.

The problem of drafting-room Gremlins remains, even in these warlike times, one for which no solution is discernable. It constitutes a perpetual challenge to the professions which must endure their activities. Fame and fortune await the man who tames them.



LEERING MALIGNANTLY, this Snari is carrying off juicy erasing shield for his midday snack.





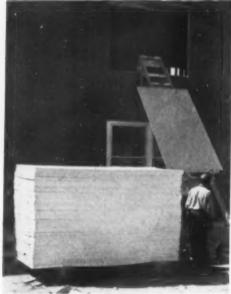
TWO-STORY HOUSES of multiple family-unit type provide homes for war workers in San Francisco's East Bay district.



ALAMEDA HOUSING PROJECT is discussed by (left to right) TOM CURRAN, superintendent, Robert McCarthy Co.; FLOYD B. COMSTOCK, technical director, Housing Authority of the City of Alameda (a unit of FPHA); and ROBERT McCARTHY, general contractor.

Mass Housing

Uses Non-Critical Materials and Minimum Labor Force



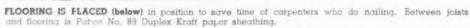
INTERIOR FINISH (left) is Empire gypsum wall-board 3½ in. thick, supplied by Pacific Portland Cement Co., nailed to studs over same type of poper sheathing used for exietior wallboard. Handoperated roller conveyor saves time in getting interior wallboard upstairs.

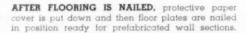
URGENT NEED OF MORE HOUSING FACILITIES for war workers in San Francisco's East Bay district induced the Housing Authority of the City of Alameda, Calif., to call upon Robert McCarthy, general contractor of San Francisco, to provide such facilities, despite the scarcity and high price of labor. A solution was found in a mass housing project in which the selection of materials to be used was made with a view to requiring a minimum of man-hours in construction.

Interior and exterior finish were both made with gypsum wallboard (using water-repellent finish on the outside) which can be put on with relatively little labor. Similarly, in all details of design from foundation to roof a major consideration was "minimum labor requirement" closely followed by preference for materials that would be as little as possible in the critical class.

(Continued on page 68)

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PLUMBING ASSEMBLIES for roughing-in were put together in jigs in plumbing shop, thus saving time and assuring uniformity.



BRICK-UNLOADING DEVICE mounted at rear of truck sets rack of bricks on ground without spilling off platform. After truck moves ahead distance equal to one platform width, device rolls next platform into position, chains are attached and it is swung safely to ground beside its predecessor. This rig was devised by R. H. Berg of Port Costa Brick Works. Truck motor supplies power for operation of device.



UTILITY TRENCHES are dug with this Cleveland trencher, here making a cut $5 \frac{1}{2}$ ft. deep and 26 in. wide in soft material.



ROOF SHEATHING was laid on diagonal to give rigidity and earthquake resistance. Ends of boards then were trimmed off with Skilsaw supplied with power from motor generator mounted on Ford truck.

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EXTERIOR OF BUILDINGS (below) has Fabco 89 Duplex Kraft sheathing nailed over studding. Then gypsum wallboard with water-repellent coating and V-joints is nailed on over paper. Wallboard gets several coats of paint sprayed on but there is no other treatment of joints.







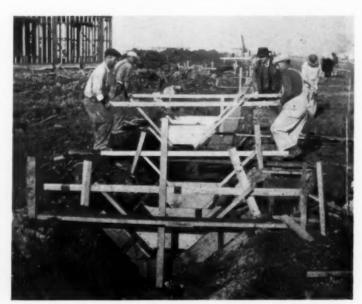
WALL SECTIONS, after being assembled in jigs, are stockpiled at central location.

For example, the "community" hot air duct through which heat from one central furnace in each apartment building is supplied to all of the family units, is made with plywood on only one of its four sides; the other three sides are of wall-board. Placing the duct in the corner where wall and ceiling meet provided nailing surface for the wallboard on two sides of the duct and for one edge of the third side, thus making it possible to complete the duct with one side in plywood to which the otherwise unsupported edge of the wallboard could be nailed.

Despite the fact that the work was done in the rainy season when mud and soft foundation conditions were at their worst, 400 family units were completed in 57 working days.



SEWER TRENCH is dug with Northwest dragline and pipe sections are laid on planks set to grade in trench bottom at Alameda housing project.



STORM RUNOFF DITCHES are concrete-lined in two operations. Bottom is paved first and then sides are poured behind forms built in sections with cross-boards to utilize opposing thrust. Form sections are spiked to inclined stakes to prevent being "floated" when concrete is poured.





ROUGH PLUMBING is put in whenever crews can work without interfering with carpenters.

oddities |



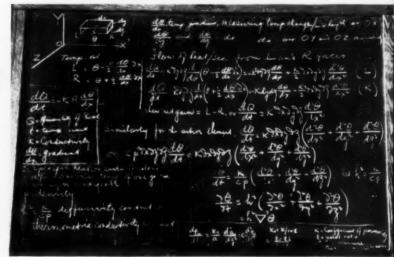
FLOOD WATERS of Verdigris River slap and smash against railroad tracks of M. K. & T. line, completely covering section in background. Wild waters near Coffeyville, Kan., are part of great floods that swept through Midwest, breaking high water records that stood for decades.

ACME PHOTO





TEAM OF HUSKIES mushes through Alaskan snows near Gulkana, winter headquarters for Alban highway crews of C. F. Lytle Co. and Green Construction Co., Iowa contractors. Many contractors solved northern transportation problem with dog teams.



IMPRESSIVE BUT BAFFLING to visiting editor is this exhibition of calculus on 2x3-ft. blackboard hung in office of ELBERT E. LOCHRIDGE, chief engineer, Springfield, Mass., Municipal Water Works. Blackboard work is by HARRY H. HATCH, division engineer, and figures indicate condition of flow of heat through a body, or principle of heat conduction known as Fourrier's Equation. Theoretical attempts have been made by some to adapt formula to seepage through earth to determine rate of consolidation of core in hydraulic fill dams.



TEETH MARKS of dragline buckets (left) show clearly in blue clay excavated by three machines for grade separation under divided roads of Detroit Industrial Expressway on contract of Charles J. Rogers, of Detroit, for Michigan State Highway Department, as described in illustrated article on construction of new freeway, Construction Methods, Feb. 1943, p. 52.

TEST OF STRENGTH is applied to new type of safety ladder of laminated construction developed by The Austin Co., engineers and builders, of Cleveland, Ohio. Each side consists of three 1x2's with throughbolts securing 1x4-in. rungs between chalks. Ten-ft. span of 16-ft. ladder supports weight of six construction workers at recently built magnesium plant to demonstrate resilience.

HOPPER SHAPED BUCKET of 1-cu. yd. capacity with discharge chute controlled by gate is swung into place by Koehring crane boom to deposit concrete in column forms for heavy ordnance material building constructed under direction of U. S. Army Engineers.

MOUNTED ON TRAVELING STEEL TOWERS 145 ft. high, Clyde stiff-leg derricks (below) with 100-ft. become place sectional units of pre-assembled limber arch trusses of 246-ft. span and 170-ft. rise for blimp hangar, 1,058x296.5 ft. in plan, at Naval Air Station on Eastern Seaboard. Each tower moves on wheels along a pair of railroad tracks as erection by Phoenix Bridge Co. continues. Arch trusses are fabricated with aid of timber connectors and all lumber is llame-proofed by pressure treatment with chemicals.



They Did It

GONSTRUCTION DETAILS For Superintendents and Foremen



TIMBER PADS used on top of 3-ft. cover to protect Springfield, Mass., 42-in. steel water main where heavy equipment must cross line are built up in three layers of 3-in. oak, with diagonal center layer, cut along edges by Ingersoll-Rand air-powered Crowe 12-in. saw. Schramm gasoline-powered 105-cfm. compressor on Ford truck supplies air for saw and for Ingersoll-Rand Little David drill which cuts bolt holes for bolting planks adjacent to four edges of mat. In left background is completed, bolted mat with permanent wire-rope bridle for handling unit. Daniel O'Connell Sons, Inc., Holyoke, Mass., is building parallel main alongside existing line for Springfield Municipal Water Works, Elbert E. Lochridge, chief engineer.

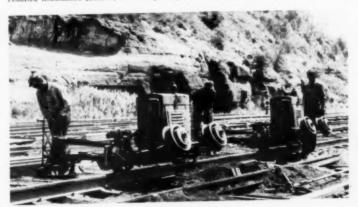
PAINT IS SPREAD at rate of 2,000 sq. it. per min. by 21st Engineer Regiment (Aviation) in its experimental work (below) on camouflaging airdrome runways at Bolling Field, D. C. Experimental equipment, furnished by Eclipse Air Brush Co., Newark, N. J., consists of 10-ft, spray bar fitted with eight atomizing nozzles. Paint is held in 50-ft, tank.



Page 70 — CONSTRUCTION METHODS — July 1943



SALVAGING SPIKES from old rails is Nordberg power-type spike puller. Operated by three men, one machine pulls from 30 to 45 spikes per minute. Adzing machines (below) follow spike puller to prepare tie seats for new rail.



BACK-UP

VALVE on dump truck (left) permits driver to travel in reverse and dump load while standing on running board

in position insuring good visibility. Safety feature of all Los Angeles County Road Department heavy dump

trucks, it is placed just outside cab and with

operating lever within easy reach of driver's right hand.

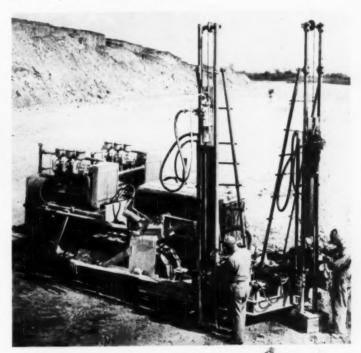
BRAKE



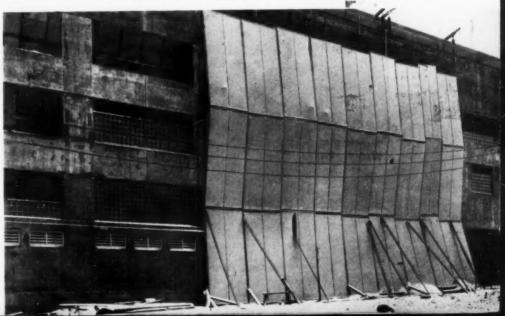
FOR COLD-WEATHER PROTECTION (right) of mortar joints of glass-block window panels in concrete walls of heavy ordinance material building. U. S. Army Engineer project in Middle West, Priester Construction Co., of Davenport, Iowa, sets up both inside and outside of walls muslin-covered frames behind which salamanders provide heat. Built of 1x2-in. lumber with 1x1-in. longitudinal support in center, frames measure 6x16 ft. and are hinged at ends in strings of three. Frames are nailed on top to 2x6-in. timber and suspended by block and tackle from roof. Adjacent panels are lightly tacked together and spaces between frames and walls at ends are closed by tarpaulin.



SPREADER-BOX BLADE ATTACHMENT on Adams diesel-powered grader simplifies construction of bituminous plant-mixed berm and gutter on 40-mi. Bradley-King City highway improvement built by California Division of Highways. Device used by Louis Biasotti & Son, contractors, performs three operations: (1) makes cut to receive plant-mixed surfacing for gutters in cut section; (2) places and shapes plant-mixed surfacing in gutters and on slope of cut; (3) shapes and compacts earth berms and covers with plant-mixed surfacing. Attachment consists of curved tool 3 ft. long shaped to contour of gutter and fitted with plate adjustable to slope of cut.



TRACTOR-MOUNTED AIR COMPRESSOR UNIT equipped with adjustable leads carrying pair of drills constitutes mobile rig for putting down deep holes in locations difficult of access. Two Davey compressors with combined output of 420 cu. ft. per minute of air at 100 lb. pressure are mounted on Caterpillar tractor, fitted with LaPlant-Choate trailbuilder attachment.



Cotton Colonial





NO PRIORITIES ON

Next to the Stars and Shipes, Cletrac is ground to be flying the Minute Man flag. Over 95 per cent of Cletrac employees are purchasing War Bonds by pay roll deduction.

THE CLEVELAND TRACTOR COMPANY

CLEVELAND, OHIO





WITH TWO TEETH RE-MOVED (left and right), bucket of Northwest dragline excavates trench and uncovers pipe to be removed without damaging it, so as to require minimum of hand excavation.





OXYACETYLENE TORCH OPERATOR, IRA DAVIS, emerges from pipe after having cut lower half of circumference at next joint, 30 ft. ahead.

UPPER HALF OF JOINT (below) is cut from outside, after clearing away earth with shovels.



Steel Pipe Dug Up

Reconditioned and Relaid At New Site to Conserve Critical Materials

By R. B. Diemer

Chief Operation and Maintenance Engineer,
Metropolitan Water District of Southern California

DIGGING BUCKETS (below) of Austin trencher, with center teeth removed, are not allowed to scrape pipe; hence more shovelers are needed.





R. B. DIEMER (right) and HENRY J. MILLS, resident engineer for Metropolitan Water District, inspect section of 36-in. pipe.

A MILLION DOLLAR PROJECT that will make a new source of water supply available to the Laguna Beach district is being carried out by the Metropolitan Water District of Southern California with the purchase of only about \$6,000 of new critical materials. This is made possible by the reclaiming of 11 mi. of 36-in. steel pipe, in 1/4- and 5/16-in. thicknesses, originally laid by Pasadena to convey water to that city from Morris reservoir and now no longer needed in that service.

This line was put down only about 9 yr. ago and is still in good condition. As fast as the pipe sections come out of the trench, they are trucked to a plant where the ends are squared and prepared for new field joints, the old coating removed, inside and out, and new protective treatment applied. The reconditioned pipe then is hauled to the new location.

Excellent progress has been made in digging up the old line with two outfits, one a Link-Belt dragline and the other an Austin trencher. Each of these rigs is aided by a Lorain Motocrane that proved useful for handling "niggerheads" occasionally found in the trench, removing pipe from the trench, or loading pipe on the trucks.

When the job was being planned it was decided to make the trench 4 ft. 9 in. wide, which would afford space on both sides for sheathing if required. However, very little sheathing has been used except in the few wet spots that were encountered. The cover ranges from 8 to 12 ft. (Continued on page 120)



DRAGLINE MOVES from end of trench into position for lifting out buried pipe section that has been uncovered.

30-FT. PIPE SECTION (below) is loaded on semi-frailer. Five pipe lengths are hauled per load.



BUCKET LINE (below) of trencher is moved aside to permit removal of "nig-



July 1943 — CONSTRUCTION METHODS — Page 75

Center Safety Barrier

CUTS ACCIDENT HAZARDS ON CALIFORNIA HIGHWAY



INSTALLED ON 4-FT. SEPARATOR STRIP is metal plate divider made of 12-in. convex steel rail, mounted by spring supports on two sides of a row of 8x8-in. wooden posts.

METAL PLATE ROAD DIVIDER, installed on the Grapevine Grade on U. S. Route 99 between Los Angeles and Bakersfield, is significantly reducing the accident toll on California's most hazardous stretch of highway. A continuous 6 percent grade on its 3-lane, 6-mi, length caused many rear-end and head-on collisions. Contributing to the hazards that produced from 10 to 14 deaths a year was the speed differential between fast-moving passenger cars and heavy trucks and trailers required to wind down the grade in low gear at reduced speeds.

Danger was decreased by widening the existing 30-ft. pavement to 50 ft. to provide a 4-lane divided highway with an 11-ft. traveling lane and 12-ft. passing lane on each side of a 4-ft. median separator strip dividing opposing lanes of traffic. A steel barrier rail, mounted on heavy wooden posts, was constructed along the dividing strip for nearly 4 mi. This road divider consists of 12-in. wide convex steel band, mounted by means of spring supports on two sides of a row of 8x8-in. wooden posts. To aid out-of-control trucks in retarding their speed, 3,000 lin. ft. of heavy concrete curb with a 15-in. vertical face was constructed on the outside edge of the 10-ft. plantmix shoulder on the downhill traffic lane.

Paving work and installation of the road divider was carried on under the supervision of Fred W. Howard, associate engineer, California Division of Highways, with W. E. Bertken acting as resident engineer. Griffith Co. was the contractor.



STEEL BARRIER RAIL prevents head-on collisions on 6-mi. Grapevine Grade between Los Angeles and Bakersfield. Pavement widened to 4 lanes and heavy concrete curb, left, also reduce accident hazards.

TVA'S FIRST DECADE

Marks Completion of 13 Large Dams for Flood Control and Power Development

THIRTEEN LARGE DAMS, 385 mi. of 9-ft. navigation channel for commerce and 8,000,000 acre-ft. of floodcontrol storage are milestones on the record of the Tennessee Valley Authority, which celebrated on May 18 the tenth anniversary of its establishment. Other TVA achievements include the production of nearly 30,000,000,000 kw-hr. of electric energy and the manufacture of phosphatic fertilizer.

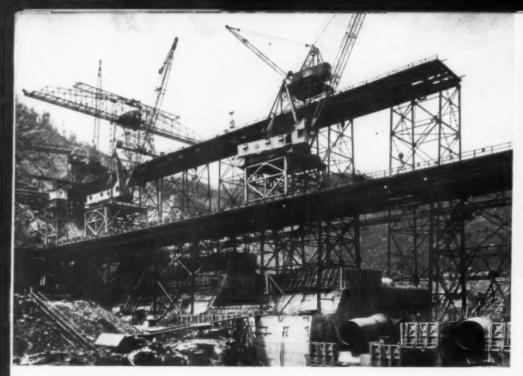
Established by Congress in 1933, TVA undertook the development of a system of multiple-purpose dams on the Tennessee River and its tributaries. Its dam-construction program made possible great industrial expansion for war and provided 600 mi. of navigable river channel to relieve over-burdened transportation systems. With its activities now almost wholly devoted to war, progress has been so speeded that the bulk of construction has been accomplished in the last three years and almost one-third of the total amount of power was produced in the last year.

First Decade Accomplishments

Operations during its first decade involved placing 7,613,800 cu.yd. of concrete and 19,962,100 cu.yd. of earth and rock fill. It cleared 168,966 acres of reservoir land and relocated 875.2 mi. of highways and 97.2 mi. of railways. Three river freight terminals are under construction and one other is projected. It made planimetric maps of the entire valley basin, covering 41,420 sq.mi. Its topographic mapping covers 30,115 sq.mi., including 12,388 sq.mi. for the War Department. Three additional dams-Kentucky, Fontana and Fort Landon-are now under construction in addition to the following 13 dams completed: Pickwick Landing, Wheeler, Guntersville, Chickamauga, Watts Bar, Norris, Hiwassee, Cherokee, Douglas, Apalachia, Ocoee No. 3, Chatuge, Nottely.

TVA has developed, in cooperation with organized employees, a program of employee relations, including





HIGHEST CONCRETE DAM east of Rockies is Fontana in North Carolina, now being rushed to completion. Concrete is here being placed in power house at base of 460-ft, tall structure from lower trestle, on which two revolving gantry cranes are operating. Two revolving and two hammerhead cranes will place concrete in lower portions of dam from upper trestle, where one of each type is already erected. Sections of two of three power penstocks (lower right) are almost ready for embedment in concrete.



FIRST-STAGE SPILLWAY BAYS at Kentucky Dam are partially completed. Downstream face of power-house is at left, with arm of second-stage cofferdam, right center.

Page 78

DAY AND NIGHT, work goes on at Fontana Dam (below). With high priority, TVA is rushing it to completion in about half time it would ordinarily take to build 460-ft, concrete structure.



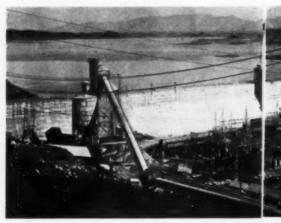


RESERVOIR AREA of about 68,300 acres extends 74 mi. upstream from Wheeler Dam in northern Alabama. This TVA water control project, 15½ mi. above Wilson Dam, is 72 ft. high and 6,342 ft.

collective bargaining in accordance with a general agreement with fifteen trades and labor unions on wages, hours and conditions of work.

The safety program of TVA has resulted in a reduction of accident frequency (number of lost-time accidents per million man-hours) from 55.7 in the first year to 12.4 in the tenth year, or a drop of 78 percent. The accident severity rate (number of days lost per thousand man-hours) has been reduced from 5.06 in the first year to 2.67 in the tenth year, or a drop of 47 percent.

Incident to providing houses for em-



NEW WORLD'S RECORD is held by Douglas Dam, constructed to point of storing water in 12 months and 19 days. A few days later, first generator was on line. Aluminum plants producing large proportion of metal needed in warplane program derive power from Douglas.



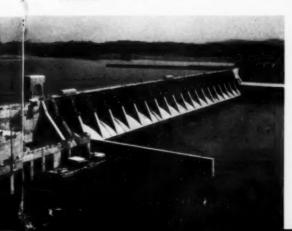


ployees on construction projects and in defense industrial areas, TVA developed a prefabricated demountable house of unique cellular construction. These houses can be moved from site to site with minimum of time and labor.

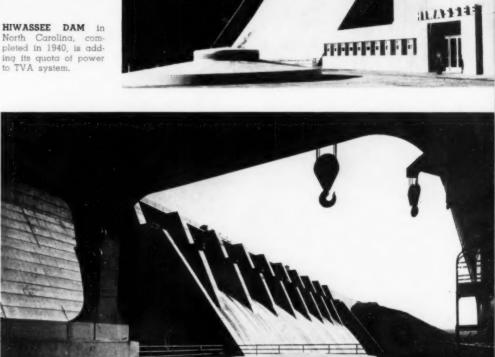
The largest producer of power for war in the Western Hemisphere, TVA is producing half as much power for battle as all the electric generators in the United States were turning out during the first World War. In addition to the TVA-constructed dams, it has acquired and now operates six others-Wilson, Hales Bar, Ocoee No. 1, Ocoee No. 2, Blue Ridge, and Great Falls. Wilson Dam at Muscle Shoals was taken over from the Army as a heritage of World War I; the others were (Continued on page 130)



NEXT UPSTREAM from Chickamauga Dam (below) in main Tennessee River is Watts Bar Dam, re-cently completed by TVA in Tennessee. Near it is TVA's new steam plant. Great industrial expansion for war is made possible through TVA dam construction.







BUILT TO CLOSURE in 16 months and 5 days, Cherokee Dam on Holston River in East Tennessee provides power for war industries. It was closed two days before attack on Pearl Harbor.

TENNESSEE RIVER WATERS (below) pour through spillway at Chickamauga Dam near Chattanooga.





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CONSTRUCTION EQUIPMENT NEWS

JULY, 1943, REVIEW of Construction Machinery and Materials

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nated as Type CR7505-K108, its contacts control 2 amp. at 115 v., 25 to 60 cycles a.c., or 0.5 amp. at 115 v., d.c. Contains amplifier tube whose filament operates on full-line voltage, eliminating need for filament transformer, and incorporates diode rectifier which functions when a.c. power is supplied. Weatherproof case is equipped with sun

shield and large, directional lens system to minimize effect of slanting sun rays. Lens system also increases relay's sensitivity. Can be mounted in any position and adjusted under actual operating conditions without removing cover. Chassis can easily be removed from case for inspection or servicing or for mounting with other apparatus in combination inclosure. General Electric Co., Schenectady, N. Y.



BALL BEARING SHEAVES are available in four types—swivel hook, safety hook, eye bolt and clevis. Have quick opening "snatch block" construction. All side covers and sheave wheels are



made of tough alloy steels. Extra-wide sheave wheels are designed to reduce rope wear and keep rope from cutting side covers. Openings are large enough to pass square knot in size rope specified for each sheave, so rope can be tied to gether and kept in use in case of breakage,—Sullivan Machinery Co., Michigan City, Ind.

PORTABLE FLOODLIGHT of wide utility is now on market. Useful for defense plants, airplane assembly and maintenance hangars, shipyards, repair shops, loading and unloading areas, yards and construction jobs. Adjustable in vertical range from bottom to top of 6-ft. pipe standard at any angle horizontally and at 360-deg. radius. Castiron circular base of 20-in. dia. provides stable footing and permits easy portability. Either 300- or 500-watt lamps can be accommodated and clear convex or stippled convex diffusing heat-resistant lenses are available. 12-in. reflector is chromium plated for high reflecting efficiency.—Steber Mfg. Co., 2451 N. Sacramento Ave., Chicago, Ill.



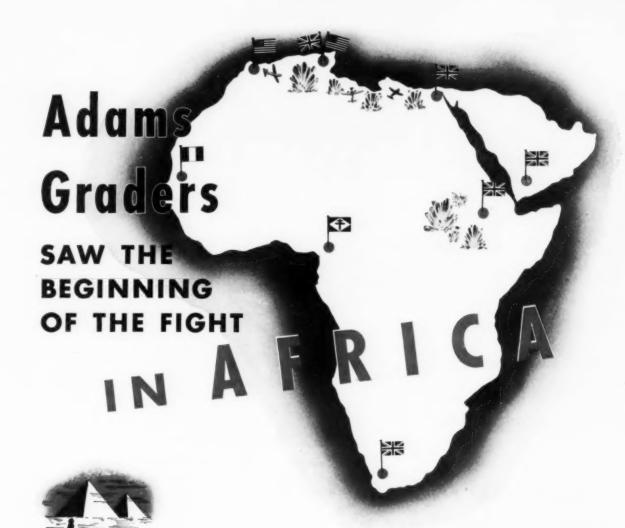
RIVET INJECTOR is said to speed up number of rivets driven per minute and reduce waste rivets by more than 90 percent. Called "Riv-N-Jector," it is light weight and has magazine holding up to



50 rivets. Special nose jaw holds single rivet ready at all times for inserting into hole of metal, relieving operator of fumbling with handful of rivets.—Cleveland Pneumatic Tool Co., 3781 E. 77th St., Cleveland, Ohio,



SMALL CAPACITY OIL RECLAIMER, designed for small plants and organizations having their own fleet of trucks and motor cars, is announced. Can usually handle limited quantity of waste lubricating oils drained from equipment used in plant or manufacturing processes, as well as reclaiming



The advance of the British army into Abyssinia during 1940-41 marked the start of

the allied capture of Africa and, in the words of a South African officer, "Adams Motor Graders operated with the advance troops in preparing roads, camp sites, etc."... To attach these machines to General Cunningham's army and to use them in subsequent campaigns, no miracle of overseas transportation was necessary—these graders were already in Africa—a part of the hundreds of Adams machines imported by African author-

ities during the past 20 years to help with the constantly expanding African road building program...Valuable in peace, their availability made them even more valuable in war!

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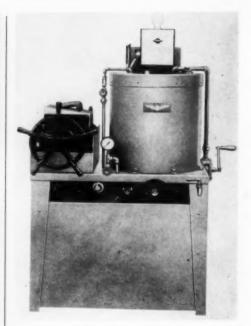
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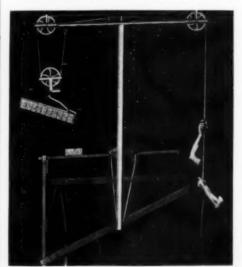
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oils from motor fleet. Model A-8 has capacity for purifying 8 gal. of dirty oil in 70 to 90 min. Is semi-automatic, operating under thermostatic control, has two-stage filter press, and utilizes common refinery earths available on open market. For handling larger quantities of lubricating or hydraulic oils, units are available in seven other sizes. All models are designed to restore used oils to substantially same values of fire, flash, viscosity, color, neutralization number, and precipitation number as the new parent oil.—Youngstown Miller Co., Sandusky, Ohio.

PORTABLE HOISTS are said to speed construction with brick, cinder blocks, mortar, flue lining and concrete. Used for almost all chimneys in recently constructed buildings at Fort Knox, Ky. Claimed



that materials were handled faster by fewer laborers with new lightweight hoists, with only few minutes required to place them on the scaffold ready for use.—Clipper Mig. Co., 4030 Manchester St., St. Louis, Mo.



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In producing a quality motor oil, it is necessary to take out the sludge and varnish-forming elements. In Stanolube H.D., after we have made a premium motor oil by a modern solvent-extraction process, we further *enrich* it by adding to this

Oil is ammunition . . . Use it wisely

highly refined oil a special oxidation inhibitor and detergent developed in Standard Oil laboratories. Thus Stanolube H. D. is a premium motor oil, plus the extra heat resistance so valuable in heavy-duty operation. That's why this motor oil is so well adapted to protect equipment against the high temperatures resulting from the close clearances and high compression of today's gasoline and Diesel engines.

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Make a side-by-side test of Stanolube H. D. with several of your hardest working trucks, against the remainder of your fleet. It represents our most advanced development in an oxidation-inhibited, detergent-type oil for protection against varnish, engine deposits, and the resultant premature overhaul and maintenance expense.

Standard Bus and Truck Oil. Designed for moderately heavy-duty service in gasoline or Diesel-powered trucks and buses where its detergency and oxidation-inhibited quality assures cleaner engine operation than can be obtained with conventional type motor oils.

A Standard Oil representative can advise you which of these war-duty oils is best fitted for your equipment.

From his experience with these products on other fleets, he can help you save both scarce parts and labor. Call any local Standard Oil (Indiana) office, or write 910 S. Michigan Ave., Chicago, Ill. In Nebraska, call any Standard Oil Company of Nebraska office.



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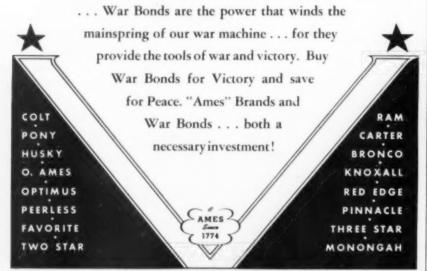




GRAY COMPANY, Inc. MINNEAPOLIS, MINNESOTA

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WELDERS' HELMET VENTILATOR is said to eliminate completely danger of poisoning by galvaniz-ing fumes and to banish all smoke from within helmet. Attached to headband of helmet, it introduces even flow of fresh air, with no draft on face



or head. Named "Cleanaire," it weighs only $3\frac{1}{2}$ oz. and takes only moment to attach. Three to 5 of air from any respirator line is enough for satisfactory operation. Makers claim that welding production in difficult quarters in Pacific Coast shipyard was increased more than 50 percent through eliminating time loss by workers coming up for fresh air and absentee loss due to galvanizing poisoning—W. Seattle, Wash. -W. H. Kitchen Co., 1107 Second Ave.,

ASBESTOS CEMENT CONDUIT, intended principally for cable installation, with new flexible coupling, requires no critical materials. "Flexcaulk" coupling, exclusive feature, consists of tubular housing of tough rigid, blow-resisting asbestos cement to



which is bonded liner of time-resisting mineralized apphalt compound, formed into barrier-type tapered liner. Conduit is said to be exceptionally hard, tough and dense, stronger and more blow resistant. Made in two thicknesses for installation with or without concrete incasement. Can be as-sembled rapidly and cheaply and easily cut on job, with only unskilled labor and simple tools required.—Philip Carey Mfg. Co., Lockland, Cincinnati. Ohio.



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carry heavy loads over concrete roads and run-It possesses speeds up to 18.8 mph. Easily convertible, unit may be hooked to flat-bed trailer capable of trucking 7,000-lb. tractor, ammunition, guns or other military supplies or an 800- to 900-gal, fuel tank. Powerful Rooter tooth is attachable to scraper to rip through baked earth or other hard surfaces.—R. G. LeTourneau, Inc., Peoria, Ill.

LEAD MELTER mounted on 30-in. dia. steel wheels can be moved readily over rough terrain, as well as in industrial plants and on hard surfaces. Fur-nished with removable cast-iron pot with 430-lb. capacity and equipped with oil burner for kero-



sene or distillate and 15-gal, capacity fuel tank. Tank is provided with hand air pump, pressure gage, safety filler and oil strainer valve. Folding leg prevents tipping. Shipping weight, uncrated, is 425 lb.—White Mig. Co., Elkhart, Ind.

IMPROVED MODEL LOADER which operates with Caterpillar diesel D4 tractor is known as Mobi-Loader W4-1. Has increased stability, greater op-erating range, reduced height to simplify transpor-



tation, and lower center of gravity. Also has bucket capacity of 11/8 cu. yd. Digging load at front, outlit travels in reverse to truck or fill and discharges material overhead.—Athey Truss Wheel Co., 5631 W. 65th St., Chicago, Ill.



ELIZABETH, New Jersey



DROP FORGED WRENCHES

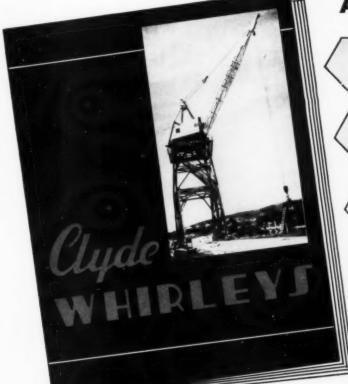
DROP FORGED WRENCHES
All ARMSTRONG Construction and Structural
Wrenches are drop forged from special
analysis tool steel, and heat treated. Openings
are accurately machined, handles are long
and tapered for ease in lining up bolt holes.
"Construction" Wrenches in Chrome-Vanadium or Carbon Steel—with 15°, 45° or 90° angle heads
with openings of from 7/16° to 2°.
"Structured" Wrenches with straight heads and off-set
handles, in Chrome-Vanadium or Carbon Steel in the sizes
listed above.

listed above.

"Box Socket Structural Wrenches, in Chrome-Vand with double hexagonal (12 point) openings from 1½¹ to 23¹/₆. (Recommended wherever on open end wrench is not required because of these safety convenience features, Write for Catalog



THIS NEW BOOKLET GIVES YOU VALUABLE INFORMATION ON A METHOD FOR --



- * Performing hundreds of time and money saving tasks on a variety of large construction jobs.
- * Cutting loading and unloading time at shipping terminals and docks.
 - * Reducing material handling costs at industrial plants.
 - * Helping to establish new shipbuilding records.

COUPON
TODAY
FOR YOUR
OF BOOKLET
No. L-12 CLYDE

CLYDE IRON WORKS, INC.
DULUTH, MINNESOTA

Now is the time to get this booklet — it has page after page of scenes showing the Clyde Whirleys in action — descriptions accompany each page — 8 pages are devoted to construction details, the Clyde Whirley is taken apart and each part is fully explained — included are details on safety features and simplicity of shipping and erection. A Clyde Whirley capacity chart is shown and there is a page on general information.

You will learn from this booklet that there are many uses for the Clyde Whirley — that its speed, flexibility and ruggedness make it an ideal machine particularly for use where construction schedules are pushed to the utmost.

CLYDE	IRON	WORKS,	INC.
DULUT	H, MI	NN.	

Please send me copy of your booklet No. L-12.

State

OF KEY CONSTRUCTION UNITS WITH A MALIE MOTOR OIL

Keeping vital air compressors running smoothly is easier and simpler with AMALIE lubrication. AMALIE helps to protect bearings of thousands of over-worked power units against breakdowns caused by heavy and relentless wear.

Pennsylvania crude and an exclusive straight-run refining process safeguard the Greater Oiliness* of AMALIE. And refining experience dating back for more than sixty-two years has helped to make a fine product steadily better.

Write Dept. C-161 for your FREE copy of our manual, "Lubrication Data on Contractors' Equipment"—approved by leading equipment makers.



WPB Inventories Expedite Use of

Used Equipment
In Construction

THROUGH INVENTORIES of used construction equipment set up by the War Production Board's 12 regional offices, more than 7,000 items of used machinery with an estimated value of \$60,000,000 have been supplied for construction jobs. The WPB Construction Machinery Division reported that utilization of this machinery during the six months prior to May 18 saved new equipment representing some 120,000 tons of raw materials.

Begun in the fall of 1942, the inventories contain approximately 500,000 items. The overall inventory is estimated to be 75 percent complete, with more registrations coming in continuously. Construction machinery specialists in regional and district offices of the WPB are charged with giving assistance to contractors, mines and industrial plants in locating idle used equipment and facilitating transactions for its sale and rental.

INCREASED USE MADE OF Synthetic Rubber ON CONVEYOR BELTS

WARTIME DEMANDS are expanding the use of synthetic rubber on conveyor belts. The Goodyear Tire & Rubber Co., Akron, Ohio, reports that an increased number of belts of Neoprene, rubber-like synthetic produced by Dupont, is leaving its plants every day. They are principally used in mines. First use began about eight years ago when coal mines started spraying coal with an oil emulsion to clean it and it was found that natural rubber covers on the belts tended to distort under the influence of the oil.

Tests and experiments are now under way to adapt Neoprene for transmission belts in applications where they might become covered with oil or grease. FREEDOM IS NOT FREE~IT IS PRICELESS * BUY WAR BONDS



Up from the log pond into the sawmill. Wood is contributing to victory on every fighting front. At home, lumber prefabricated under the TECO Connector System of timber engineering has replaced metal in thousands of heavy war structures such as the aircraft assembly plant shown above. Engineered timber is destined to play a leading role in the reconstruction era to come. You, also, can design in timber with TECO—for strength, durability, and economy. Write today for our literature.

TIMBER ENGINEERING COMPANY

NATIONAL MANUFACTURERS OF TECO TIMBER CONNECTORS AND TOOLS
WASHINGTON, D. C. PORTLAND, OREGON

Giant, engineered timber trusses of the world': largest timber-built factory, designed by The Austir Company, of Chicago, engineers and builders.



The **TECO** Ring Connector spreads the load on a timber joint over practically the entire cross-section of the woods...brings the full structural strength of lumber into play.

WOOD GOES TO WAR - An MGM Technicolor short by James A. Fitzpatrick. Ask your theater when you can see it.







ENGINEERS PREDICT Post-War Trucks WILL BE LIGHTER

STRONGER, LIGHTER AND MORE ECONOMICAL TRUCKS will be built after the war, according to engineers of Mack Trucks, Inc. They foresee a great change in the materials that form the body. Magnesium, aluminum, high grade secondary aluminum and other lightweight materials will cut truck weight and thereby allow for more weight in the payload. A lighter engine with greater horsepower in proportion to weight is also predicted. High octane gasoline, now used exclusively for aircraft, will play a major role in the engine development.

No change is anticipated in body appearance, however. The engineers point out that a cube is still the best bet when it comes to getting the most merchandise within the smallest area. No matter how far afield automobile lines may stray, this fact will keep truck bodies within the confines of conventional designs.

Rust Prevention AIDED BY PAINT MADE FROM BROWN ROCK

PASSAGE OF WATERS containing iron compounds in solution through prehistoric deposits of volcanic lava created pigment for a successful rust preventive paint. Iron oxide, silica and alumina are the most important substances in the brown rock from which pigment is made for S. R. P. rust preventive paint, product of L. Sonneborn Sons, Inc., New York, N. Y.

When used in paint, the iron oxide remains impregnated in the other compounds, producing remarkable dispersion of active color particles and a high degree of opacity. The silica is largely of the tough and amorphous type that provides exceptional resistance to abrasion. The alumina additionally fortifies the combination so that when associated with

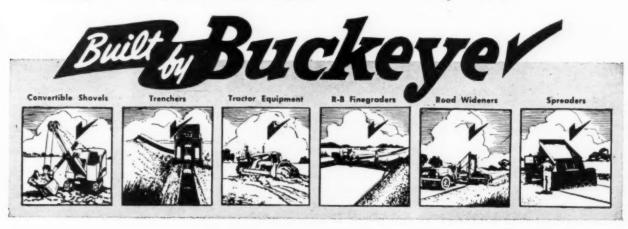


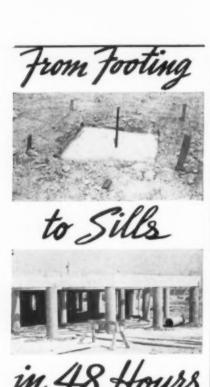
IT'S a Buckeye—just as it is Buckeye on all the fighting fronts. Bulldozers are as much a part of mechanized warfare as tanks, guns, planes. The modern army division includes in addition to all its other mobile equipment, five bulldozers.

Primarily a tool of the Army Engineers, the bulldozer levels sites for airfields and camps, builds bridge approaches, grades roads, repairs bomb pocked terrain, does 101 other vital jobs. Fast, responsive cable control; moldboards that roll the dirt; engineered balance; battering ram construction—These are features that make Buckeye front line equipment for Uncle Sam.

There is no proving ground like a battleground. Your best buy will be Buckeye.

BUCKEYE TRACTION DITCHER CO.
Findlay • Ohio







8" 9" 10" 114" 12" 13%" SQUARE INCHES 50.26 64 78.54 100 113.1 144

The heavy laminated fibre tube that can be hand-sawed to length on the job. Practical up to 10 ft. Shipped two lengths to car—up to 24 ft. each. Easy to handle—requires minimum bracing. Easily stripped or allowed to slough off.

IMMEDIATE DELIVERY

Widely Used and Approved for Cantonments and Other Government Construction WRITE FOR DELIVERED PRICES

SONOCO PRODUCTS COMPANY
HAPTSVILLE, S. C. MYSTIC, CON-A.
ROCKINGHAM, H. G. SARNOGO, N. J. LOWELL, MASE.

(Continued from page 90)
a suitable vehicle the result, the makers
claim, is a permanently homogeneous
blend which fills surface crevices and
produces a paint film that is entirely impervious to the passage of liquids and
gases and is completely free from porosity.

First Used by Indians

Weather-resistant properties of the rock were first discovered by American Indians. Chipping off fragments, they crushed the pieces in flint mortars and ground up the resultant powder in vegetable oils, thus producing a paint that held its color and surface in the desert. As used today, it produces a protective film for exposed surfaces that defies weather extremes, light, heat, gases, alkalies, sea water, and acids.

in 48 Hours With NOT ESSENTIAL FOR WORK IN WAR PLANTS

WORKERS UNABLE TO OBTAIN birth certificates are not barred from employment in factories working on government contracts. The War Department has explained that no proof of citizenship of any kind is required on any contracts except those that are for aircraft or aircraft parts or are classified as secret, confidential, or restricted. On the latter types, applicants must give satisfactory proof that they are American citizens. To employ aliens, contractors must obtain the approval of the government agency involved.

When proof of citizenship is required and no birth certificate is available, it is sufficient to produce an official certificate of naturalization or citizenship or other satisfactory evidence of American birth. A certificate showing honorable discharge from the U.S. Army, Navy, Marine Corps or Coast Guard will also serve, unless it shows that the bearer was an alien at the time of issuance. Another substitute may be a prescribed Declaration of Citizenship form executed in the presence of two witnesses, one of whom must be an Army or Navy District Procurement, Factory or Plant Protection representative, an officer of the Army, Navy or Marine Corps, or a member of the Auxiliary Military Police on duty at the plant.



STATIONARY and PORTABLE
In All Sizes and Capacities!



Hetherington & Berner asphalt mixing plants, products of the pioneer builder of asphalt machinery in America, ircorporate the latest features of design which have been proved in performance. Specifications conform to the most rigid state and city requirements, both as to engineering design and safety regulations. Write for Bulletin CM-260.

HETNERINGTON & BERNER INC.





WELLPOINT SYSTEMS

JETTING PUMPS

FOR SALE

Prompt Shipments

Send for our New 60 page illustrated catalog

"GRIFFIN POINTED WELPOINT FACTS" chock full of latest information on Wellpoint Systems for dewatering, emergency and permanent water supply systems, also information on pressure pumps and date for jetting.

GRIFFIN WELLPOINT CORP.

881 EAST 141st ST. . NEW YORK, N. Y

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Your PAGE Bucket can stand the gaff day after day without asking favors . . . but to keep your Dragline machine operating at top efficiency, take care of your bucket! Any operator who follows the simple maintenance and operation suggestions below will get trouble-free performance—which in a PAGE Bucket, means superior performance!

Boost Production ... Keep America Strong



GOOD MAINTENANCE IS ESSENTIAL TO PRODUCTION

- 1. CHAINS. Chain life is shortened by uneven wear. Turn them over periodically.
- 2. TEETH. Sharp teeth are vital to fast digging. Renew points frequently.
- 3. "PICK-UP". Dragging the bucket after loading wastes time and causes excessive wear.
- CONTROL. Help your operator prevent damage to bucket from uncontrolled dropping and jerking by keeping machine in adjustment.



New Gluing Methods Developed for Lumber Construction

A NEW GLUING PROCESS which makes it possible to transform surplus lumber into marketable stock at low cost is known as "spot welding." Boards are joined together edge to edge by setting glue only in spots along the joint, with high frequency radio waves used to set the spots. At Vanport, the world's largest housing project, construction was expedited by a new method of gluing the predecorated interior plasterboard to the studding. This resulted in saving 17,500 lb. of nails per 5,000,000 sq. ft. of plasterboard.

Special glues have been developed for use in blueprinting machines which have the advantage of a quick permanent adhesion, eliminating slippage of the joints. The new glue bond will withstand various baths to which jointed blueprint paper is subjected while traveling through the machine.

First Tire From

Government-Made

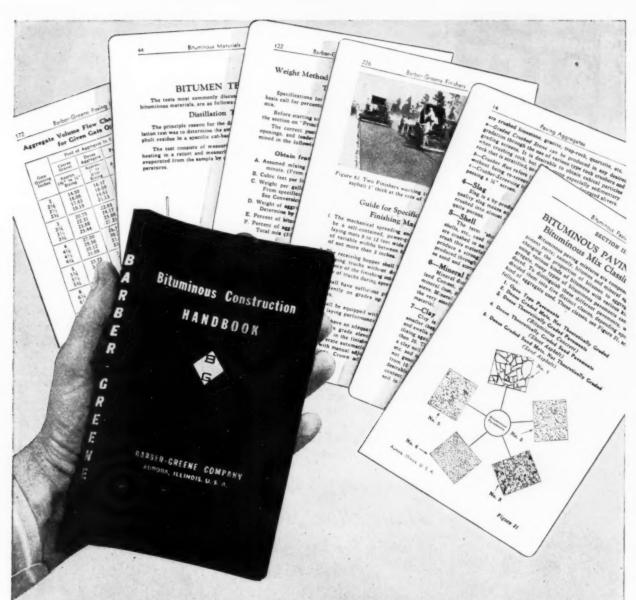
Synthetic Rubber

Is Completed

FIRST SYNTHETIC RUBBER TIRE to be made entirely of government-produced materials was completed on March 24. Made in the size for Army jeeps, its only difference from a conventional tire is the date molded into both sidewalls. The synthetic rubber was manufactured in a government-owned plant in Akron operated by The Goodyear Tire & Rubber Co., which was placed in operation a year ago and is said to have a higher production total than any other synthetic rubber plant in the country.

Styrene for the rubber was in the first carload to leave a government-owned plant in Texas City, Tex., which was the first government styrene plant to go into

(Continued on page 96)



Now Available

● For many years, Barber-Greene has published data on bituminous construction for its own engineers and servicemen. As this material was seen by others in the industry, many requests were received for such data. The compilation of this data into the B-G Bituminous Construction Handbook is the result.

The Handbook has been completely revised with this issue, greatly amplifying

the general engineering data. It is not a picture book or catalog. It is a compilation of material our organization has gathered through close contact with construction operations in this country and abroad.

The Handbook is now available (without charge) to contractors and engineers. Because of paper and material shortages, we hope only those having a definite need or interest in this field will request these Handbooks. Address your request to: Bituminous Equipment Sales, Barber-Greene Company, Aurora, III., U. S. A.

BARBER - GREENE



FOR BIGGER PAYLOAD DIGGING

Engineered all the way through to do the job. Backed by fifty years of specialized manufacturing skill and experience. The pay-off bucket for better, more efficient 1943 work.

Haiss Hi-Power has the brute strength for heavy digging, and the power in its bite to yank loose an embedded boulder. Weight and closing power combine to dig deep and tear out a heaping bowlful at every grab. Alloy steel parts for abrasion resistance, long bearings for longer wear.

Bucket agencies throughout the country. Write, wire for prices, delivery and catalogs.

GEORGE HAISS MANUFACTURING CO., INC. 138th St. & Canal Place, New York 51, N. Y. (Continued from page 94) production. This plant is operated by the Monsanto Chemical Co. Butadiene for the rubber was from the first carload to leave the government-erected butadiene



FIRST GOVERNMENT-MADE TIRE of synthetic rubber is examined by E. J. THOMAS, president, and CLIFF SLUSSER, right, vice president. The Goodyear Tire & Rubber Co.

plant operated by the Carbide & Carbon Chemical Co. in Institute, W. Va., likewise the first government butadiene plant to start production. The tire itself was made by Goodyear.

Worn Wheel Bearings Blamed for Early Failure of Truck Tires

CHIPPED AND WORN wheel bearings have been isolated as the cause for premature failure of many truck and trailer tires. Close inspection of more than 100 truck and trailer fleets revealed that loose rollers, chipped or worn rollers, or chipped or worn outer or inner races are among the sorts of bearing trouble that cause tire "flat spots," according to Goodyear Tire & Rubber Co. engineers.

It was found that less than 50 tires wear out among every 100 applied by truck-trailer operators. The other 50 must be discarded before their normal life expectancy because of blowouts, cuts, repair failures or mechanical defects which cause premature breakdowns. In one fleet of 497 trailers, two barrels of bad bearings were discovered in 90 days. They were charged with wearing out a total of 146 tires before the tires had yielded their maximum potential service.



. . . THE BYERS CRANE YOU NEED IS BEING SHIPPED TO AN OUTFIT THAT NEEDS IT MORE

THAN YOU DO.

In the meantime, owners of current and older models of Byers shovels and cranes may depend on Byers Farts Service to help them keep present equipment working steadily and satisfactorily.





Write for Catalog and Prices
INGERSOLL STEEL & DISC DIVISION
BORG-WARNER CORPORATION
New Castle, Indiana
Plants: New Castle, Ind.; Chicago, Ill.; Kalamazoo, Mich.



A NATURAL for any job

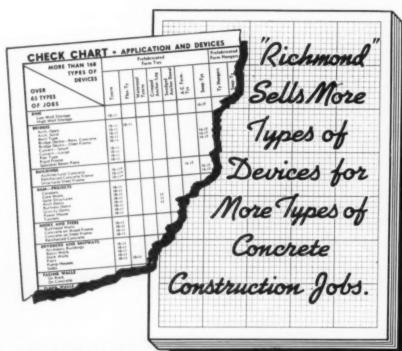
No matter what the service—construction, heavy-duty trucking, mining, logging, oil well drilling, generating, marine power—Cummins Dependable Diesels are a *natural*. A *natural* because Cummins Diesels have proved their ready adaptability . . . their consistent, long-time dependability . . . their over-all economy, in the widest variety of applications . . . automotive . . . industrial . . . marine.

It is this record of proved performance in every heavy-duty service which explains today's demand for Cummins Dependable Diesels . . . that's why every Cummins Dependable Diesel is tagged for some essential war job that demands power of unquestioned reliability. Cummins Engine Company, Columbus, Indiana.

Model HBI-600 Cummins Dependable Diesel. 150 hp. at 1800 rpm.



FORM-TY ENGINEERING FACTS



FORM-TY ENGI-NEERING IS THE REASON!

Army; Navy; Ordnance Department; Air Force; internationally-known construction companies and local builders—all agree that "Richmond's" form-Ty Engineering makes better concrete construction, faster concrete construction, less costly concrete construction.

from "Richmond" you get better made concrete form-tying devices, every one of which is specifically engineered for the job it's required to do. From "Richmond" you get a scope of service that begins with job working drawings complete to the last detail, and carries through to ties delivered to the job correctly tagged for their exact place in the work. Let us consult with you on your concrete form-work. We'll show you facts and figures proving why you, too, will do better to do business with "Richmond."



Road Employees Subject to Wage-Hour Law

EMPLOYEES engaged in the maintenance and repair of toll roads and bridges, as well as railroad bridges, come under provisions of the federal wage and hour law. This principle was upheld by the Supreme Court in the first two cases to reach that body involving the status of construction employees under the Fair Labor Standards Act.

In one case, the court held that the act applies to employees of a toll road company who are engaged in maintaining and operating a toll road and drawbridge. The decision declared that roads and bridges used by persons and goods passing between various states are instrumentalities of interstate commerce.

No Decision on Construction

The Supreme Court in this case ruled only on maintenance and repair, leaving the question of employees engaged in construction operations subject to further judicial determination.

In the other case, the court ruled that employees of a construction company engaged in constructing new abutments and repairing superstructures of railroad bridges are also covered by the act.

Oxyacetylene Flame Adjustment Chart

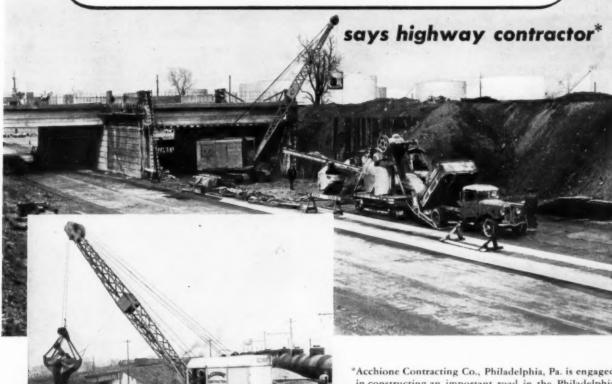
Prepared for New Welders

NEW CHART for oxyacetylene flame adjustment was recently issued by the Air Reduction Co., New York, N. Y. Prepared particularly to guide new workers, it shows natural color photographs of five fundamental flame adjustments: Acetylene burning in air; a strongly carburizing flame; slight excess of acetylene flame; neutral flame; and an oxidizing flame.

Being completely graphic, it conveys the appearance of the various welding flames faster and more accurately than descriptive material can. This is important, since the best manipulative skill is wasted unless flame adjustments are correct.

"With Gulf Lubricants

we steer clear of mechanical delays one big reason we're ahead of schedule"



*Acchione Contracting Co., Philadelphia, Pa. is engaged in constructing an important road in the Philadelphia industrial area. This job involves grading, paving, and building a new railroad bridge without stoppage of railroad traffic. With Gulf lubricants and fuels, this contractor is ahead of a tough schedule.

Call in a Gulf Service Engineer before you start <u>your</u> next job—he can help you get extra hours of trouble-free service from your equipment.

"With new equipment and spare parts hard to get, more than ever we rely on proper lubrication with Gulf oils and greases," says highway contractor.* "Gulf lubricants provide the kind of protection that heads off mechanical troubles and keeps our equipment on the job—one big reason we're ahead of a tough schedule."

The progress and profit on any construction job depend to a large extent on the efficiency of the equipment that does the work. That is why many leading contractors have adopted Gulf Lubrication as a standard part of their operating practice—they know from experience that they get full capacity performance and extra hours of trouble-free service from every unit.

Call in a Gulf Service Engineer before you start your next job—let him demonstrate the *higher protection* value of Gulf Quality Lubricants. He will show you how



you can get more efficient lubrication of your equipment at no additional cost! Write or 'phone your nearest Gulf office today.

GULF OIL CORPORATION . GULF REFINING COMPANY . PITTSBURGH, PA.

HAVE A DRINK OF FRESH SEA-WATER

OMMON salt sea water is converted into safe, crystal-clear, distilled water—for drinking, cooking, and other purposes—by Cleaver-Brooks distilling units. Engineers of the Army, the Navy, and the Marine Corps roll these portable units to forward areas for a dependable source of drinking water supply. This equipment makes effective use

of the Cleaver-Brooks multipass down-draft heating principle, first made famous in Cleaver-Brooks tank car heaters, kituminous boosters, and steam generators.

Cleaver-Brooks production right now is going 'round the clock for military needs, but we are glad to send complete information on tank car heaters, bituminous boosters, automatic steam plants—for your future needs.

Cleaver-Brooks Co., 5125 No. 33rd St., Milwaukee, Wisconsin, U.S.A.

Cleaver-Brooks

TANK CAR HEATERS . . . BITUMINOUS BOOSTERS . . . AUTOMATIC STEAM PLANTS









"Pocket Airfields" BUILT AS TRIBUTE TO SULLIVAN BROTHERS

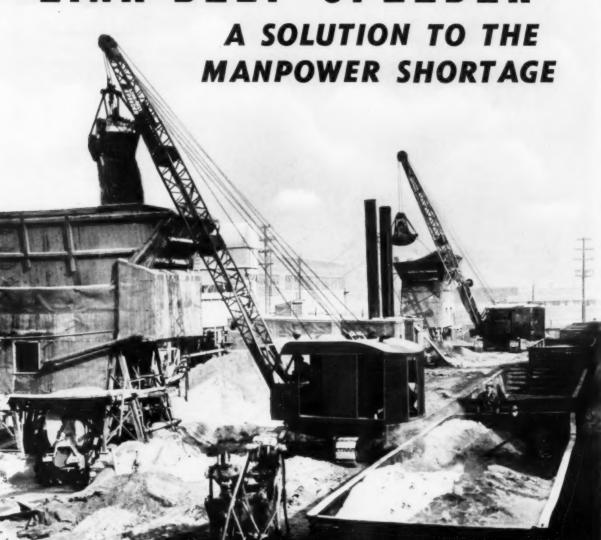
AS TRIBUTE to the five Sullivan brothers who lost their lives in the sinking of the cruiser Juneau in the Solomons, 180 emergency landing mat panels over their required quota for the day were turned out by workers in the Long Island City plant of the Irving Subway Grating Co. The extra mats, known as "pocket airfields," total 4,500 sq. ft., a good portion of a runway.

They represent a full hour's output for each man, equivalent to \$472.50 in wages. A check for this amount was sent as a contribution to the Waterloo sponsors of the Sullivan Memorial Fund. Earmarking the extra mats for "Sullivan Field," they dispatched a telegram to Secretary of War Stimson requesting that an airport "somewhere on the Pacific battlefront" be laid down and named in honor of the brothers.

Sound-Conditioning Tiles Are Adapted to Movement and Re-Installation

SOUND - CONDITIONING MATERIAL that can be easily transferred from one location to another is produced by the Celotex Corp., of Chicago, Ill. Acousti-Celotex tiles are installed by being cemented to existing plaster or nailed or screwed to wood furring strips. Consequently, they can readily be removed and re-installed elsewhere. Many instances are on record in which this material has been stripped from one room where it was no longer needed and placed in another or replaced in another building. This offers an advantage in factories where the changing demands of war production often mean frequent rearrangement of working plans and movement of departments.

LINK-BELT SPEEDER-



Speedy finger-tip control, added strength, greater mobility and rapid booming assure you efficient day-in, day-out performance. These time and trouble-saving Link-Belt Speeder features are helping contractors overcome many war-time construction problems. The job doesn't come that's too tough for a Link-Belt Speeder—because there's a model to fit every type of job.

THE MORE BONDS YOU BUY-THE SHORTER THE WAR!!

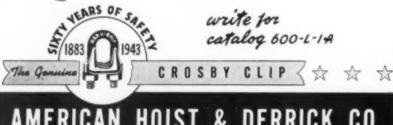
SPEEDER CORPORATION, 301 W. PERSHING ROAD, CHICAGO, ILL.



14-inch clearance between top of carbody and revolving deck. Workmen cannot be crushed if caught between deck and carbody.

The doors slide, instead of being hinged. Cannot be damaged by being caught open in close clearance.

3 Operator has complete vision without any sacrifice of comfort or convenience.



AMERICAN HOIST & DERRICK CO.

AMERICAN TERRY DERRICK CO. . . . South Kearny, N. J.

NEWS FROM MANUFACTURERS

About Their Products

The publications reviewed below, will keep you posted on latest developments in construction equipment and materials available for your use.

LIGHT STEEL PREFABRICATED CONSTRUCTION—Lindsay & Lindsay, 222 W. Adams St., Chicago, Ill. (8 pp., two-color) Gives complete details of the step-by-step procedure of assembling Lindsay Structure, new method of using "pretensed" sheet metal in light structures of great strength and rigidity. Contains case histories on applications in the industrial, automotive, and marine fields. Used for machine housings, refrigerator buildings, industrial buildings, truck bodies, ovens, processing rooms and unit coolers.

BUCKEYE SPREADER—Buckeye Traction Ditcher Co., Findlay, Ohio. (8 pp., two color) Describes and pictures spreaders, giving specifications. Claims savings in time, labor, material, and money. Widely used for road and airport maintenance and construction.

INTERIOR BOILER AND TANK COAT—Saverite Engineering Co., 1043 Clinton St., Hoboken, N. J., (4-p. folder) Describes permanently plastic material which is applied like paint to protect boiler drums, metal, wood or concrete storage tanks, and water-submerged surfaces against corrosion and fungus growth. Serviron never dries hard but stretches and contracts with temperature changes. Stops further pitting when applied to already pitted surfaces. May be used to coat valves, ammonia lines and underground pipes and tanks, as well as in ships, schools, hospitals, power plants, laundries and process industries. Odorless and tasteless, it may be safely applied in inclosed spaces, as it does not give off obnoxious or dangerous gases.

BLACK TOP ROAD CONSTRUCTION UNITS—Littleford Bros., Inc., 457 E. Pearl St., Cincinnati, Ohio. (Two-color, illustrated folder) Describes road brooms, "Spray Master" pressure distributors, supply tanks and "tankar" heater. Action pictures of all equipment.

STANDARD EQUIPMENT CATALOG—Link-Belt Co.. 307 N. Michigan Ave., Chicago, Ill. (184 pp., illustrated) Describes all popular products in representative types and sizes, with preference given to more widely adaptable designs. Covers chains, sprockets, roller chain drives, silent chain drives, bearings, base plates, hangers, take-ups and back-stops, shafting and accessories, couplings, clutches, pulleys and gears, buckets, spray nozzles and hand winches, conveyor belt idlers, screw conveyors, car spotters, power shovels, and speed reducers. Dimensions, weights and list prices are given.

THERE'S SOMETHING NEW IN THE PICTURE





Daily movement of a staggering quantity of oil from New Orleans to the Eastern States is the No. 1 war job of the Southern Railway. The Southern assigns its fleet of General Motors Diesel freight locomotives as the key motive power to expedite this important flow.



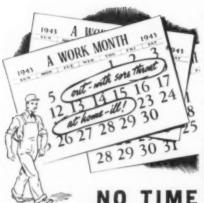
Reconstruction and new construction are going to need plenty of this hard-hitting, casy-on-the-fuel power. With normal refinement and development speeded up by war, with production expanded, GM Diesels will be ready to serve in more fields and in more ways than ever.

Out of every war has grown a new era in transportation. This one is no exception. The pattern of that new era had been set, even before this war, by the General Motors Diesel Locomotive. And its Leadership in the Peace to come is forecast in the way this locomotive is today meeting the challenges of war.



ENGINES . . 150 to 2000 H.P. . . CLEYELAND DIESEL ENGINE DIVISION, Cleveland, Ohio

ENGINES 15 to 250 H.P..... DETROIT DIESEL ENGINE DIVISION, Detroit, Mich.



NO TIME FOR "TIME OUT"!

A BSENTEEISM, with its terrific toll from war work, springs from two sources. One is just plain "don't give a damn". The other is actual illness. Much of the time lost through easily contracted illnesses like colds and sore throat can be avoided . . . through vigilance at possible contagion points.

Better Contagion Control **Reduces Sick-Absenteeism**

Health protection starts at contamination points such as the drinking water tank or bucket where a tin cup or dipper is often used by many workers. Check this possible chain of mouth-to-mouth contagion! Safe, clean Dixie Cups, used but once and thrown away, offer helpful protection at this vital point.

• Take the Water to the Men

For workers and crews spread out on location where drinking water is not readily accessible, the modern water boy Portable Water Carrier with individual paper cups. Important time is saved. Men are adequately watered at their work, health is protected.

For complete information, catalogs, and prices, write today!

Just in Case . . .

Uncle Sam's armed forces and high-priority war plants are using so many of our paper cups that we may not always be able to supply certain sizes you may want. We'll do the best we can. Uncle Sam must come first. We're sure you'd want it to be that way.





ONE OF THE VITAL HEALTH DEFENSES OF AMERICA-AT-WAR

JAW CRUSHERS-Diamond Iron Works, Inc., and Mahr Mfg. Co. Division. Minneapolis, Minn. (8-p. bulletin, illustrated) Gives full details, illustrations and sizes of all jaw crushers made by this company, including rock, sand and gravel crushing, screening, conveying, and washing equipment, with portable and stationary plants.



MAHAM Felt-Cote ROOFS & SIDING

ROOFS AND SIDING American Steel Band Co., Pittsburgh, Pa. (28 pp., il-lustrated) Describes "Felt asbestos - protected cote, metal roofs and siding for industrial buildings, cluding hangars, airplane assembly shops and repair docks, munition works, ord-nance plants, supply de-pots and warehouses. Comprehensive diagram gives details of Felt-cote

construction. Asbo round roof ventilators are described in an 8-p. folder issued by the same company. Standard details, dimensions, and capacities are listed. May be made of Felt-cote metal or other approved materials.

MAINTENANCE MANUAL-Independent Pneumatic Tool Co., 600 W. Jackson Ave., Chicago, Ill. (24-p. book, pocket size) Tells how to get maximum service from portable electric tools. Subjects covered: (1) Major parts of a portable electric tool; (2) operating "don'ts"; (3) care and repair of Thor portable electric tools; (4) what to do when a tool fails to operate; and (5) other maintenance tips. The chapter on care and repair includes sections on the motor, cable, switch, brushes, clutch, and commutator. Repair instructions concern only the commonest and simplest sources of trouble which require no special tools to remedy. Pictures and diagrams clarify all information.

MELTING KETTLES-Hauck Mig. Co., 124 Tenth St., Brooklyn, N. Y. (4-p. folder, two-color) Describes improved line of melting kettles for tar, asphalt, bitumastic, pitch and jointing com-pounds. Heavy duty wheel kettles and skid type kettles for roofing and waterproofing are pic-tured. Claimed to save fuel, time and labor, to be smokeless and to have long life.

CONTOUR SAWS-Doall Co., Des Plaines, Ill. (250 pp., illustrated) Part 1, the art of contour machin-ing, is divided into chapters titled: Development of contour sawing and filing machines; contour sawing and other machine tools; basic Doall applications; Doall contour sawing and filing machines; and examples of contour machining as reported by Doall users. Chapters in Part 2, precision con-tour saw bands, are: Saw testing division of the Doall contour saw laboratory; research division of the laboratory; and Doall contour saws in the making. Part 3 deals with the company's trade school. Chip production and eleven basic machine tools are described and diagrammatically illustrated.



Paster **CONTINUOUS** Pumping under all conditions

ontractors standardizing on Go Contractors standardizing on Gorman-Rupp Pumps are getting extra hours instead of costly shut-downs due to pump failures. There's a DEFINITE REA-SON, More dependable. No priming jet to clog. No control valve to Jam. This is important today when every piece of equipment has to take a beating. Let your distributor show you why more contractors are switching to Gorman-Rupp's every day.

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Self-Priming Centrifugal Pumps



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Joint Assemblies speed up construction. They sim-plify installation of dowels and joint material and accurate, locking and alignment of dowels. They are designed for fool-proof, trouble-free functioning.

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Drives Have Covered the World

 Bucyrus-Erie Excavators have operated in every country on the globe-from the Arctics to the Tropics. Reliability and proven performance on jobs under all manner of conditions are first requisites, and the years of experience by leading excavator builders with Diamond Roller Chain Drives have demonstrated their uniform reliability, high power transmitting efficiency, and durability.

Driving the crawler traction is another important job and here, too, the performance of Diamond Roller Choin Drives has justified their wide selection. The illustration shows their application on the Bucyrus-Erie Model 15-B.

Diamond Roller Chains have the great strength and the inherent elasticity to withstand long hours of gruelling operation and shock loads. . . . Operators of excavating and construction equipment prefer DIAMOND because of these qualities and, particularly, for the small amount of attention required on the job. Much of the construction machinery used in the building of roads, air fields, camp sites, embankments, bridges, railroads, irrigation ditches and the like, at home and on foreign battlefronts, is Diamond Roller Chain driven. . . . DIAMOND CHAIN & MFG. CO., 418 Kentucky Avenue, Indianapolis, Indiana. Offices and Distributors in All Principal Cities.



Diamond Roller Chains a factor in trouble-free shovel performance.



Material Handling with a Model 15-8



ROLLER





PROPERTIES OF SYNTHETIC RUBBER—**B. F. Goodrich Co.** (8-p. catalog section, illustrated) Describes oil and heat resisting properties of Ameripol D used in many specialized industrial applications. Features are hardness, tensile strength, elongation, weight, color, odor and taste, elasticity and permanent set and resistance to tear, abrosion, flexing, oils and solvents, and heat. Tables list the properties of various compounds of Ameripol D, including a rough guide indicating the services where use of the synthetic rubber is practical.

* * *

COMPARATIVE INDEX—Air Reduction Co., 60 E. 42nd St., New York City. (4-p. folder) Electrode comparison chart that helps to simplify buying of competitive welding electrodes. Details principal AWS and ASTM electrode classifications and indicates which electrodes produced by 20 leading manufacturers meet the different requirements.

* * *

PRESENTING EQUIPMENT LINE—Davey Compressor Co., Kent, Ohio. (32 pp., two color) Covers company's complete line of portable air compressors, including Air Aristocrat, Premier, Davey "97S", Auto-Air, Track-Air, and Industrial. Includes photographs, specifications, dimensions and weights. Also describes pneumatic saw and its use in lumbering.



CRANEMOBILE—Bay City
Shovels, Inc., Bay City,
Mich. (12 pp., illustrated)
Explains advantages of
crane and carrier as a
complete unit. Describes
and illustrates CraneMobile parts, including power
load lowering device, long
pin-connected boom and
jib, safety independent
boom hoist and collapsible
hi-gantry. Accompanied by
folder giving specifications

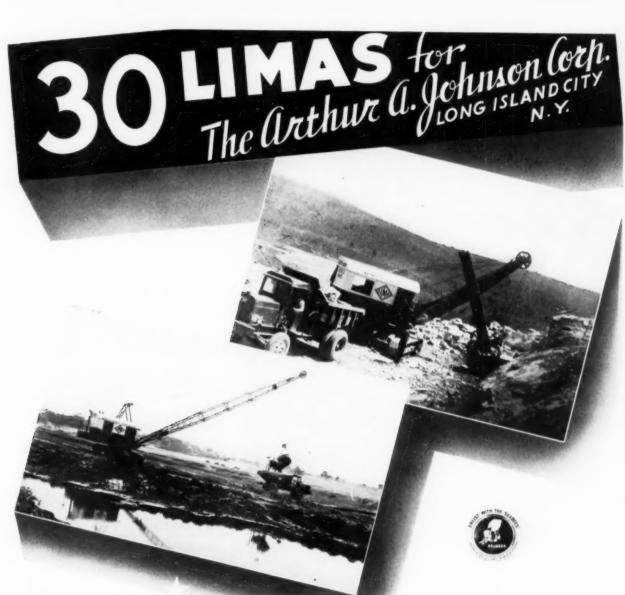
folder giving specifications and lifting capacities of Model 18, 16½-ton crane mounted on specially designed T-50 carrier.

* * *

HOW TO MAKE YOUR SAFETY EQUIPMENT LAST LONGER—Mine Safety Appliances Co., Pittsburgh, Pa. (32 pp., illustrated) Details practical "do's and don'ts" of safety equipment care for key personnel, in a form readily adaptable for instruction of equipment users. Sections cover every type of personal protective equipment, from protective hats, gas masks, respirators and gas instruments to safety clothing. Attention is given to many common-sense methods for repair and preventive maintenance of articles on the hard-to-get list.

* * *

CORROSION RESISTANT COATINGS—Carbosite Corp., First National Bank Bldg., Pittsburgh, Pa. (3-p. folder) Contains descriptive information about coatings for steel, wood and concrete. Describes typical industrial applications, coal industry applications, stack coating, shop coat for natural drying and baked finishes, and marine coatings for hulls, holds, bottoms and piers.



SINCE 1935 The Arthur A. Johnson Corporation and its Associates have been buying LIMA Shovels, Draglines and Cranes, both gas and electric driven, for their important construction jobs throughout the country. Their first four LIMA Shovels were put to work on the Quabbin Reservoir Dike job near Enfield, Massachusetts. Then came the preparation of the New York World's Fair site, involving 7,000,000 Cubic Yards of excavation—a rush job—where no delays could be tolerated—so they bought eleven (11) more LIMA Shovels and Draglines. After that four (4) more were bought for New

York's Sixth Avenue Subway. Then The Johnson Corporation and its Associates moved in on a gigantic earth moving project at Bermuda, where speed and continuous operation were the prime factors. For this job they purchased eleven (11) more LIMA Shovels and Cranes. The continued preference for LIMA Machines, year after year, is proof of the outstanding and profitable service that LIMA Shovels, Draglines and Cranes give their owners. Lima is proud to have had a part in many of the construction accomplishments of The Arthur A. Johnson Corporation.

THE LIMA LOCOMOTIVE WORKS, INCORPORATED - Shovel and Crane Division - LIMA, OHIO

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SAN FRANCISCO, CALIF
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SHOVELS CRANES

DRAGLINES

LIMA

SHOVELS, ¼YD. TO 3½ YD. CRANES, 13 TONS TO 65 TONS DRAGLINES, VARIABLE

NOW you can get 10 basic books of DAY-IN-DAY-OUT VALUE TO THE CIVIL ENGINEER in one handy volume that—

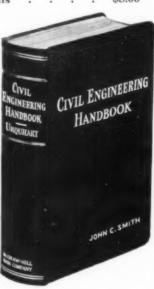
- answers your questions in any ... blends theory, practice and division of civil engineering;
 - fundamentals equally;
- . . . is comprehensive, up-to-date and
- . . . is reasonably priced.

CIVIL ENGINEERING HANDBOOK

Editor-in-chief: Leonard C. Urquhart, Professor of Structural Engineering, Cornell University. Second Edition, 870 pages, 6 x 9, over 900 illustrations and diagrams

HERE are the fundamentals of the vari-ous subdivisions of civil engineering for men who actually plan, select, design, and construct civil engineering structures and projects. In each division a noteworthy specialist has contributed a compact treatise, developing fundamental theories as well as stating more involved ones, making the book not only a comprehensive reference work of modern civil engineering practice, but also adaptable for systematic study of any of the fields represented in it.

In this edition you will find surveying practice carefully defined; developments in highway and railroad work thoroughly covered; specialized data on design and construction of framed structures; new specifications for concrete and steel design to conform to approved specifications; important data on foundations, sewerage and water supply.



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 -Land surveying
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 -Mydregraphic surveying
 -Milway furnouts, connecting tracks
 and cressings
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- and crossing and banking of highway pavements;

 Widening, spiraling and banking of highway pavements;

 Highway materials and tests;

 Construction must of coads and pavements

 Mechanics of Materials

 Mechanics of Materials

 Fluid pressure

 Pipes and open channels

 Flow of viceous fluids

 Menauroment of flowing water
- —Roof trusses
 —Dead-load stresses in bridge trusses
 -Lateral forces on bridge trusses
- -Slope-deflection
- Moment distribution
 Riveting and welding
 Bearing plates and grillage beams
- -Bridges -Mill Buildings -Multi-story buildings
- Dosign of concrete mixtures

 Mixers and mixing

 Buildings and walls, footings and
 foundations
- Box culverts and rectangular frames
 Properties of soils
- -Mechanics of soil resistance
- -Underpinning
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CARE AND CONSERVATION OF BRUSHES-Osborn Mig. Co., 5401 Hamilton Ave., Cleveland, Ohio. (7-p. pamphlet) Instructions on care of paint, varnish and lacquer brushes now being manufactured from war-created substitutes. helpful details on the way to break in a new brush and preserve it, as well as how to recondition old, hardened brushes to make them fit for further service. Describes wartime emergency brushes which are made with 55 percent bristle and 45 percent horsehair or other adulterants.



LINING FOR TANKS-B. F. Goodrich Co., Akron, Ohio. (4-p. folder, illustrated) Catalog section on new sheet Koroseal linings for tanks made of welded steel, wood or concrete. Points out that this product, a synthetic elastic with many rubber-like qualities, has extended the field in which tank linings may serve, due to physical qualities that make it resistant to many strong corrosives, such as nitric and chromic acids. Tables show the chemical resistance of these linings to solutions of inorganic acids, solutions of inorganic salts and alkalis, plating solutions and organic materials. Advantages in various types of service are outlined, as well as limitations of the material.

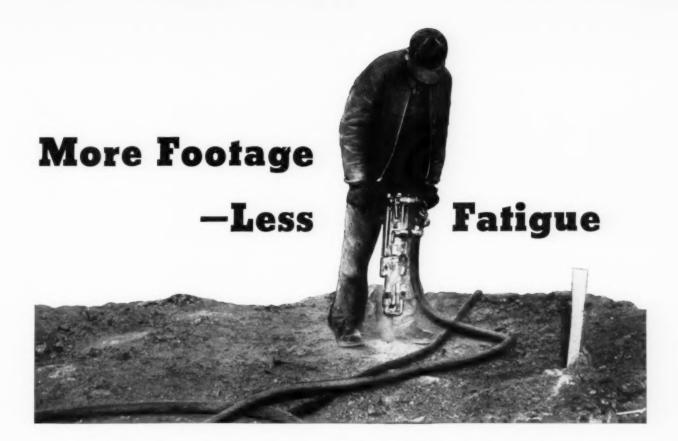


ELECTRIC DRILLING RIGS Westinghouse Electric & Mig. Co., East Pittsburgh, Pa. (58 pp., two-color) De-scribes electric drilling rigs to meet any drilling problem, with photos, charts and diagrams. Discusses advantages of electric drilling, tells where to use d.c. variable voltage rigs and where to use a.c. equipment. Typical equipments for various drilling

depths are listed for both a.c. and d.c. drilling and their maintenance and care are discussed. included is a section on auxiliary equipment required on drilling rigs. Double-page diagrams show the plan view layout of complete a.c. and d.c. drilling rig equipment.

MINERAL WOOL-U. S. Department of Commerce (24-p. booklet) Commercial standard on mineral wool cold storage insulation. Based on extensive research by qualified engineers, it covers both cold storage area and pipeline mineral wool insulation and establishes minimum specifications for low-temperature areas with mineral wool for the guidance of manufacturers, distribtors, installers, contractors and users. Single copies are available on request from Industrial Mineral Wool Institute, 441 Lexington Ave., New York City.

MOGUL ELECTRIC BONDER—Metallizing Co. of America, 1330 W. Congress St., Chicago, Ill. (4-p. folder, illustrated) Describes new unit for preparing hardened metal surfaces for metallizing. Said to eliminate guesswork in preparation, carbon ring and necessity for a lathe. Folder gives specifications, price and delivery data.



With faster footage a "must" on drilling jobs today, the man who holds the drill all day long knows that easy-riding Gardner-Denver Sinkers help him put in more footage—with less fatigue. That's because precision-built Gardner-Denver Sinking Drills are en-

gineered for better balance and greater speed and power.

Each of the Gardner-Denver Sinkers shown below is a champion performer in its weight class. For full information, write Gardner-Denver Company, Quincy, Illinois.



Gardner-Denver S-33 Sinker—an outstanding performer for its weight class.



Gardner-Denver S-45 Sinker—a favorite among users of the 45pound class.



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Gardner-Denver S-73 Sinker-67 pounds of speed and power.



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THESE 1-MAN CONCRETE RODDING MACHINES LICK THE MANPOWER SHORTAGE





ONE MAN and a Whiteman Rodding Machine can screed 4 cu. yard of low slump mix in 5 minutes or less.

With Whiteman Rodding Machines the sturdy engine does the heavy work. ONE MAN operates the machine, pulling it forward as the power driven screeds simultaneously level and compact the pour.

For concrete slab work—floors, ramps, parking, highway and airport strips—these machines multiply the work capacity of even depleted crews. They leave the slab ready for floating and finishing with 1-MAN Whiteman Finishing Machines . . . do it faster . . . produce better concrete.

If you have a concrete job to complete quickly at minimum cost, wire for the name of your nearest distributor.

Manufacturers of Whiteman Concrete Rodding and Finishing Machines—adjustable Screed Stake Caps.

Whiteman MANUFACTURING CO.

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Los Angeles 26, California



LiQUID GAS UNIT—American Liquid Gas Corp., 1109 S. Santa Fe Ave., Los Angeles, Calif. (24 pp., illustrated) Explains how Algas units are heating and powering industry. Claimed to produce a dependable, economical gas supply right on the premises, they convert liquefied petroleum gases to industrial use and may be used either as standby plants to fill in when normal supplies are cut off or as a constant gas supply. Recommends Algas carburetion units for buses and stages, common carriers, contract haulers, farm, mining and industrial tractors and equipment, heavy trucks, stationary engines and new-type locomotives.

* * *

SAFETY CODE FOR CRANES, DERRICKS AND HOISTS—American Standards Assn.. 29 W. 39th St., New York City (90 pp., illustrated) Comprehensive outline on a national basis of fundamental safety provisions for hoisting machinery, Code applies to construction, installation, inspection, maintenance, and operation of cranes and derricks driven by steam engines, electric motors, or internal-combustion engines; to their runways; to simple drum hoists of whatever motive power; to overhead electric hoists and their runways; to overhead air hoists; and to hand-powered derricks. Construction details, definitions and diagrams are provided for each type of crane. Copies are available from the Association at \$1.50 each.

Huge Timber Arches For Navy

(Continued from page 49)

Blimp Hangar

ments then are set in pairs in a timber frame where bracing and purlins are placed to produce a so-called "braced bay" 20 ft. in width. Completed sections then are removed from the assembly frame to a wheel-mounted transfer car which is moved along railroad tracks and spotted within reach of the stiff-leg tower derricks which erect the arch trusses. Each of the two towers moves on a pair of railroad tracks spaced 33 ft. apart on centers. As an aid to speedy erection, a special double sling on the main fall line of the derrick suspends the arch truss section in the exact position it will occupy in the completed structure.

Construction of the blimp hangar was done under the direction of the Navy's Bureau of Yards and Docks, with Lt. Comdr. J. L. Callaway in immediate

charge.



OSGOOD

recommends the continued
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Stamps—and the observance
of preventive maintenance
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OSGOOD AIR CONTROL

with the operating ease and efficiency of steam. OSGOOD Air Control is simple in operation, easy to maintain, and costs next to nothing.

GENERAL EXCAVATOR CO.

Sizes: 38-12-58-34 DIESEL - GAS - ELECTRIC

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IRONEROLLERS
6 to 12 Tons
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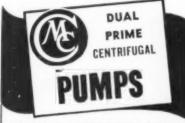
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Sizes: ½ to 2½ Cu. Yd. Diesel-Oil-Gas-Electric OSGOOD O MARION (6) OHIO (1) U.S.A. (5)

SHOVELS DRAGLINES - CRANES Crawler & Wheel Mounted

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ple design and ease of maintaining CMC equipment are features that m t the pockets of owners today. Your no C distributor is ready to help you SERVICE from your present equipment

CONSTRUCTION MACHINERY CO. WATERLOO, IOWA



"STANG WELLPOINT EQUIPMENT"

IN WAR AND IN PEACE-Contractors and engineers "in the know" use STANG Wellpoint Equipment to keep construction jobs "In the Dry."

Write for this "Y" Bulletin and read how STANG Wellpoints are speeding the war effort, and cutting war costs—just as they can speed your jobs and cut your cost, if you are a builder of drydocks, tunnels, dams, pipe lines or sewers.

FOR SALE OR RENT

JOHN W. STANG CORP.

NO. TWO BROADWAY, NEW YORK CITY also 2322 Newton Avenue, San Diego, Calif. 2310 Calhoun Street, Houston, Texas

Calling All Construction

(Continued from page 57)

With him on the program were Brigadier General B. C. Dunn, North Atlantic Division engineer, Corps of Engineers, and Charles H. Sells, newly appointed New York state superintendent of public works, who spent 13 months building airports and camps in Persia. Toastmaster was John P. H. Perry, vice president, Turner Construction Co., of New York.

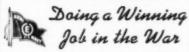
Eligible to volunteer are all skilled workers from 18 to 50 years old. Representatives of Engineer Corps division, district and area offices throughout the country have been instructed to interview these men and determine their qualifications for the special skills required for troop units. Those who qualify will be given a letter designating them for the Corps of Engineers, which will be honored at the applicant's induction station, provided he volunteers before his order number comes up.

Opportunities for Advancement

Enlistment in the field in which they have experience and training means the best opportunities for advancement. The way is open for these workers to earn specialist and noncommissioned officer ratings. In addition, it means additional experience that will be valuable in the post-war construction program. The Corps of Engineers is using the latest construction and building equipment. Some of the new machinery developments will not be available in civilian life until after the war. Consequently, members of Engineer units not only keep abreast of their trade but ahead of it.

Skilled employees previously deferred because of the importance of the construction program in this country are now subject to selective service. Discussing the anticipated drop in construction, General Reybold said: "The work to be done in continental United States is not expected to reach more than 30 percent of that done last year and much of that is already in place. In addition to work now nearing completion, little is to be expected other than, perhaps, a few gen-

(Continued on page 114)



ONAN GASOLINE DRIVEN ELECTRIC PLANTS provide electricity for construction projects remote from commercial power sources, and for emergency and standby service.

Thousands of these reliable, sturdy plants are doing a winning job on all the fighting fronts, providing electricity for many vital war tasks.

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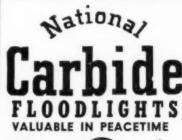
Ratings from 350 to 35,000 watts. A.C. 50 to 800 cycles, 110 to 660 volts. D.C. 6 to 4000 volts. Also dual A.C. and D.C. models. Air or watter cooled.



Details gladly furnished on your present or post - war need for Electric Plants.

D. W. ONAN & SONS

1645 Royalston Ave., Minneapolis, Minn.





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FCR ALL PURPOSES WHERE FLOODLIGHTS ARE REQUIRED

Simple in Construction **Economical** in Cost Dependable in Operation

Available in 1500, 8,000 and 16,000 candlepower units.

Write today for litera-ture showing entire lines of Floodlights and Lanterns.

NATIONAL CARBIDE CORP. 60 East 42nd Street New York, N. Y.



Butter one brick with Brixment mortar, colored with any good black mortar color. Then butter another brick with mortar made with 50-50 lime and cement, and the same mortar color.

Set both brick aside for a couple of weeks. You'll find that the sample made with Brixment mortar retains its full, rich color (right), while the other turns dull or pale,

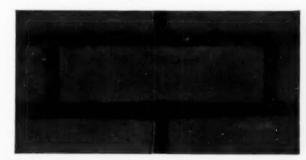
BRIXMENT Does Not Fade Mortar Colors!

The permanence of the mortar color in the joint depends not only upon the pigment selected but also upon the mortar materials. Too frequently a good job of brickwork is spoiled by the use of a mortar that fades the color or that leaves a white scum of efflorescence on the mortar joint.

Brixment helps prevent this condition. For Brixment is practically free from the aggressive chemical compounds or soluble salts so frequently the cause of fading and of efflorescence.

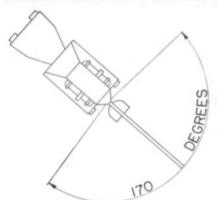
The waterproofing material combined with Brixment during manufacture is a further protection to the color because it helps prevent moisture from penetrating the mortar joint and leaching out the pigments.

Brixment is therefore recommended by manufacturers of both mortar colors and face brick, for use with their products.



BRIXMENT For Mortar and Stucco

Louisville Cement Company, Incorporated, Louisville, Kentucky. Cement Manufacturers for Over a Century,

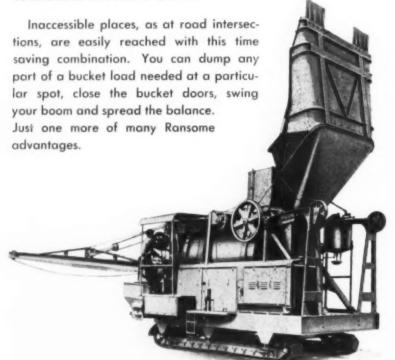


A BOOM SWING OF 170 DEGREES

Ransome.

34-E DUAL
DRUM PAVERS

COMBINE a boom swing of 170 degrees with the Ransome hydraulically operated bucket, permitting swinging and spreading simultaneously, and you've got a batch distributing combination that's hard to beat.



Write for



Literature

RANSOME MACHINERY COMPANY NEW JERSEY

(Continued from page 112)
eral hospitals, some increase in the
number of prisoner-of-war internment
camps, and other such relatively small
projects. The scene is shifting to the
actual theatres of war, where there lies
ahead a tremendous task for construction
workers."

Huge Construction Outlay

Since June, 1940, according to the Chief of Engineers, the war construction, real estate acquisition and maintenance program, directed first by the Quartermaster General and later by the Engineers, has amounted to a total of nearly \$11,000,-000,000, of which 90 percent was in place on April 30, 1943. The war construction program alone in continental United States involves an expenditure of more than \$9,000,000,000, including a total of nearly 2,000 major installations and several thousand smaller jobs. All but about 6 percent of the total program was in place by the end of April. Ground force installations amounted to about \$2,500,-000,000 and air force jobs reached a similar total. These projects have supplied facilities for accommodating about 5,000,-000 troops at one time. At the same time, the arsenal of the democracies was built at a cost of nearly \$3,000,000,000. Other installations, such as general hospitals, ports of embarkation, storage depots, harbor defenses and passive protective measures, completed the program.

Construction Schedules Beaten

General Reybold paid special tribute to the American construction industry which, he declared, "can take justifiable pride in the fact that its job was in most cases done ahead of scheduled time. It can also be proud that it has fought a clean fight that has been free of the embarrassing charges of graft and advantage grabbing. I also pay tribute to the large army of workers who labored with youan army that reached a total strength of a million. Let it be recorded to the loyalty of your employees and the fairness of your labor policies that work stoppages due to jurisdictional and other labor disputes amounted to only 6/100ths of one percent of the total man-hours involved in this unprecedented program. In addition, in cooperation with our brothers in the construction industry, the Corps of Engineers has assumed leadership in accident prevention."

Foreign Service Record

Reviewing the record of the Engineers in North Africa, General Reybold told of air-borne engineers who flew nearly a thousand miles to forward airdrome sites. They had one field operating for flying

(Continued on page 116)



You can replace your worn-out socks in 8 minutes...



...but it may take <u>weeks</u> to replace a ruined valve

The answer is
Preventive Maintenance
now with Shell
Diesel Lubricants





IMPROPER lubrication makes valves stick, carbon pile up. Then you get blow-by, wasted power and in many cases a warped or broken valve . . . a part that's not easy to get these days. This means an idle piece of equipment while you wait

for the delivery of a new valve.

"Time out for repairs" is a luxury no Diesel operator can afford under wartime stress. That's why more than the usual care should be taken to make sure your engines are properly lubricated. This means more frequent check-ups . . . more attention paid to the quality of the lubricant used.

Increasing the number of check-ups may take a little more time, but those few extra minutes will be well

spent when compared to the costly delays they can help you avoid. Don't wait for a breakdown. Call in the Shell man now. Let him help you plan your Preventive Maintenance.



First oil refinery to win Army-Navy "E"—

SHELL DIESEL LUBRICANTS
AND SHELL "DIESELINE"

Bucket teeth Veterans

NOW FULL OF YOUTH!





GOOD AS NEW! That's what you'd say about these worn drag line bucket teeth after they had been salvaged with Coast Metals Hard-Facing! In fact, they are now better than new. Because Coast Metals Hard-Facing makes them extra-resistant to abrasion and wear, they will outlast and outwear ordinary teeth several times.

A trial will convince you that Coast Metals Hard-Facing can't be equalled for keeping equipment constantly on the job without unnecessary time out for repairs or replacements. Application is simple—either by the electric welding arc or the oxy-acetylene torch—to new or worn shovel and bucket teeth, lips and other parts of excavating and earth-handling equipment of any ferrous metal, including manganese steel, alloy steel, cast iron and chilled iron.

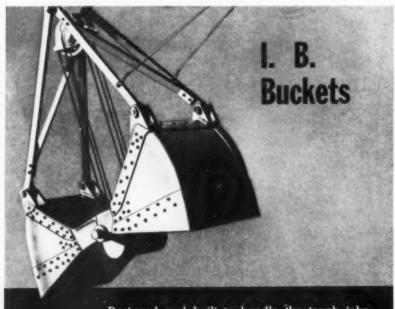
Tell us your wear-resistance problem. Coast Metals Hard-Facing can help you make your equipment last longer.

COAST METALS, INC.

Plant and General Offices: Canton, Ohio
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COAST METALS hard-facing weld rods

YOUR EQUIPMENT'S LIFE PRESERVER AGAINST WEAR



Designed and built to handle the tough jobs with ease, I. B. buckets are unusually sturdy. Extra large sheaves reduce rope wear and maintenance. They take big, deep, clean bites. Now available in rope-reeve, power-wheel and link type. For prices and further facts write to INDUSTRIAL BROWNHOIST CORPORATION, Bay City, Michigan. Offices in New York, Philadelphia, Pittsburgh, Cleveland and Chicago.

(Continued from page 114)

fortresses in three days and another field for fighter planes in four days. Transport planes flew all equipment, including steel plank landing mats and a fair amount of bitumen for stabilizing soil to the site. Engineers have participated in landing operations, rushed through satisfactory water supplies under difficulties, operated port facilities, sped the construction of pipelines to insure adequate supplies of high octane gasoline for the forward airfields and repaired and built highways.

Appeal for Skilled Personnel

The Corps of Engineers is now appealing to the construction industry to aid in enlisting additional skilled personnel to duplicate these feats throughout the world. Base pay ranges from \$50 a month for a private to \$138 for a master sergeant, including housing, food, clothing, transportation, medical and dental care and other incidentals. In addition, standard army allowances are made for dependents. A 20-percent increase is added to base pay for service overseas. Men who demonstrate skill and ability will soon be advanced to higher grades or given technician ratings with higher pay.

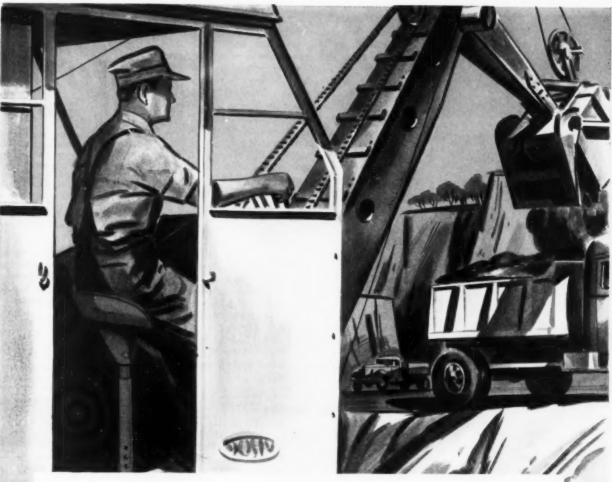
Vacuum Removal of Excess Water

Hastens Concrete Floor Finishing

(Continued from page 57)

Each floor finishing crew had a line of at least 65 mats, sufficient to cover the full 200-ft. width of a building. The mats, supplied by Vacuum Concrete, Inc., Philadelphia, were nearly all of the standard 3x4-ft. size, easily picked up and shifted by one man. Each mat consisted of a plywood backing fitted with a raised edge incorporating a rubber gasket and flap which made a tight seal against the wet concrete. Water was drawn off through a fabric filter screen covering the lower face of the mat by means of a vacuum supplied through a rubber hose

(Continued on page 118)



HE KNOWS HIS BUSINESS

He operates a power shovel and delivers top performance because he knows how.

We manufacture industrial friction materials that are correct and dependable because we know how.

When you specify Raybestos you get brake linings and frictions of 38 years proven quality and performance, specially engineered to meet the exact requirements of every machine that you operate.

Raybestos can supply all your friction material needs. And fastest deliveries are assured through your local Raybestos distributor. See him or wire us.

THE RAYBESTOS DIVISION of Raybestos-Manhattan, Inc., BRIDGEPORT, CONN.

RAYBESTOS IS AMERICA'S BIGGEST SELLING BRAKE LINING

Ray bestor INDUSTRIAL FRICTION MATERIALS

FOR SHOVELS . CRANES . HOISTS . TRACTORS & EARTH MOVERS



CHROME CLAD STEEL TAPE

Engineers the country over acclaim the "Peerless" the perfect steel tape for their needs. The ¼-inch chrome Clad Steel line is just the right size and weight—and a lot more serviceable than ordinary steel tapes. The jet black markings are easy to read against the satin chrome surface that won't rust, crack, chip or peel. The sturdy four arm metal frame has a smooth winding mechanism that can be locked at any point. See the "Peerless" at your dealers. Write to us for your copy of Catalog 12 C.

SAGINAW, MICHIGAN - New York City
TAPES - RULES - PRECISION TOOLS

(Continued from page 116)

attached to a valve-controlled pipe nipple centered in the plywood backing. Hose lines from the mats were connected to 2-in. pipe manifolds, each equipped with 20 nipples. These manifolds in turn were connected by hose lines to the vacuum pumps, where the water was caught in tanks of 50- to 60-gal. capacity so arranged that the flow could be diverted to an empty tank as soon as a full tank had to be removed. The tanks were an integral part of each pump unit assembly and moved with the pump from place to place.

Five vacuum pumps were available to operate the vacuum systems on the job Three of these units were Fuller rotary vacuum pumps, mounted on trucks for ready portability, with a rated capacity of 840 cfm. at 20-in. vacuum, and two were skid-mounted Worthington 22x9-in. compressors (with a rated capacity of 1,184 cfm. of free air), capable of pumping 1,000 cfm. at 20-in. vacuum when operated as vacuum pumps. Each of the latter pumps could serve a full line of 65 vacuum mats across the full width of a building. The truck-mounted units were able to handle 50 to 55 mats.

Rotary Finishers

Following the vacuum processing of the concrete, initial floating of the surface was accomplished with Kelley gasolinepowered compactor floats, seven of which were in use on the job. Behind these machines, seven Whiteman gasoline-enginedriven rotary trowels, each equipped with three revolving steel trowels, as shown in an accompanying photograph, gave the slab surface its first trowel finish. The latter machines are so constructed that by changing the trowels they can be used for all steps in slab finishing, eliminating any need for hand troweling. A final hard troweling was given the floors of the Naval supply depot by hand, in accordance with specifications.

Soon after the final troweling, the surface of the concrete was sealed for curing purposes with an impervious membrane of Aquabar Kuraseal applied as a liquid spray. The liquid film rapidly hardened into a transparent, impervious membrane. To assist the spray operator in obtaining full coverage of the concrete, the liquid compound contained a colored dye which faded out in a few hours after application.

Supervision

Floor construction for 160 acres inclosed in one-story warehouses was one item of the large contract executed by Brann & Stuart, contractors, for the Navy Department under the direction of the

(Continued on page 120)

STRIP, PAINT faster, easier!

Are you up against the problem of stripping paint or removing caked-on oil, grease, muck from construction and road building equipment before repainting and reconditioning? Then try doing this work the faster, easier Oakite way by applying recommended Oakite stripping or cleaning solution with the Oakite Steam Gun. You will find deposits are thoroughly, speedily removed from:

Tractors
Dirt Loaders
Portable Cranes
Road Scrapers
Spreaders

Dump Trücks Steam Shovels Air Compressors Pick-up Trucks Snow Plows

Write today for NEW, 24-page, FREE booklet giving complete story!

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HOISTS

GASOLINE • DIESEL

BELT DRIVEN

- For over 69 years we have been building fine hoisting machinery.
- Our duplicate part system insures proper fit of our factory built replacements.
- For the defense and offense war effort keep your present hoist in good working condition.

We can help you!



We proudly fly these flags



MANUFACTURING COMPANY

How a LeTourneau Rooter Can Help You



You can increase the efficiency of your Tournapull and tractor-operated Carry-all Scrapers by first breaking up all hard materials — shale, hardpan, sunbaked clay or frozen ground — with a Le-Tourneau Rooter. By using a Rooter you get bigger Scraper loads in less time, and cut down maintenance on your tractors and tractor tools.

On most earthmoving jobs in tough, rocky material, rooting also eliminates the need for shovels, compressors and drills and gives better fragmentation for Scraper loading than does blasting. It's safer . . . faster . . . and far cheaper. Thus, you save on both manpower and tools,

Built to Work On Your Dozer Tractor

Both LeTourneau Rooter and Dozer are single-cable operated . . . can be combined on standard rear-mounted 2-drum Power Control Unit . . . to root and doze over short hauls with one tractor, or for pusher loading rooted materials into Carryall Scrapers. Your tractor operator easily handles both

tools . . . neither interferes with the operation of the other.

Quickly Interchangeable

Rooter is easily dropped to free tractor for LeTourneau Carryall Scraper, Crane and other drawbar work . . . thus, further increases the usefulness of your tractor.

2,000 In Use

With more than 2,000 rugged Le-Tourneau Rooters now in use by successful contractors, miners, pit and quarry operators and loggers all over the world ... these job-proved methods are sure to give you lower cost earthmoving . . . same time, will help you lick the man and machine shortage problem.

Put these profit-making work-increasing Rooter methods into operation NOW. And for parts and repair service . . . call your LeTourneau-"Caterpillar" dealer. He is equipped to keep your tractors and LeTourneau earthmoving equipment working at full efficiency for Victory.

RIPPING 8-INCH CONCRETE — When breaking up concrete like this, you can exert about 50,000 lbs. pull by combining the forward travel of the "Caterpillar" D8 tractor with the lifting power of the LeTourneau Rooter.



ONE ROOTER — 4 TRACTORS — Although this LeTourneau Rooter is built to take the horsepower of two big tractors, the contractor here used 3 "Caterpillar" D8's pulling, plus one D7 pushing, to break up frozen ground. LeTourneau Rooters will handle your tough work.

ROOTER SAVES BLASTING — (below) It was originally estimated that 200,000 lbs. of powder would be required on the rocky portion of this 1,500,000-yd. project. Use of a LeTourneau Rooter cut powder consumption to less than 15,000 lbs.



R.G. ETOURNEAU INC

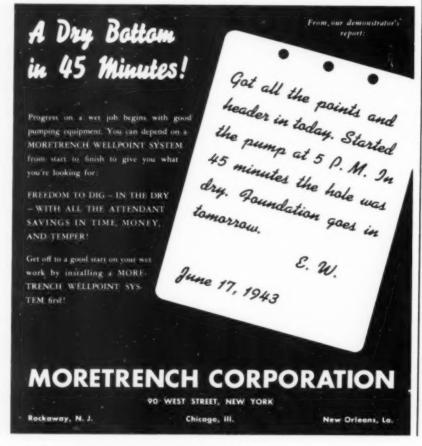
Peoria, Illinois . Stockton, California

Manufacturers of DOZERS, CARRYALL* SCRAPERS, POWER CONTROL UNITS, ROOTERS*, SHEEP'S FOOT ROLLERS, TOURNA-PULLS*, TOURNAROPE*, TOURNATRAILERS*, TOURNAWELD*, TRACTOR CRANES.

* Trade Mark Reg. U.S. Pat. Off.







(Continued from page 118)

Bureau of Yards & Docks, of which Rear Admiral Ben Moreell is chief. The project was constructed for the Bureau of Yards & Docks under the immediate supervision of Lt. Comdr. H. V. Martin (CEC) USN, officer in charge of construction. V. H. Cramell and J. W. Minick were the architects. The contractors' project organization worked under the top supervision and management of H. B. Madden, project manager; William E. Kliefoth, general superintendent of buildings; and Charles P. Hartline, general superintendent of grading and utilities.

SteelPipe Dug Up RECONDITIONED

(Continued from page 75)

AND RELAID

When the pipe was installed in 1934, the trench was dug chiefly with a backhoe. A dragline was selected for digging up the line because with that equipment there would be less danger of damage in making final clean-up before lifting out the pipe sections.

Pipe Removal Methods

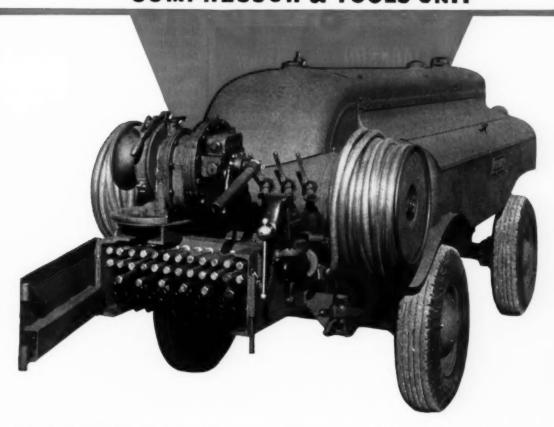
When a 30-ft. length of the pipe has been uncovered in the trench an oxyacetylene torch is taken into the pipe through the open end, and a cut is made at the next joint in the lower part of the pipe not accessible from above. The torch then is brought out and the cut is continued around the upper part of the joint, thus leaving the 30-ft. section free to be lifted out either by the dragline or one of the truck-cranes. The pipe weighs about 2 tons per 30-ft. length.

When working in good ground it has been found possible to lift out as much as 60 and sometimes 120 ft. of the pipe in one piece. This saves time because the joint cuts can be made on the bank more quickly than in the trench. Where more than one length is lifted out at a time it is economical to maintain two cutting crews, using the second crew for the cuts made on the bank.

The dragline crew has averaged more than 300 lin. ft. of pipe taken out per

(Continued on page 122)

DRILLMASTER



HERE'S A "PACKAGE" — designed by Schramm for the many jobs required on both construction and maintenance that call for a portable compressor and the tools to put this power to work . . . No matter how distant or how inaccessible your location is—one order, one shipment brings you this compact, ready-to-work power plant and tools.

They're All in This Complete Unit

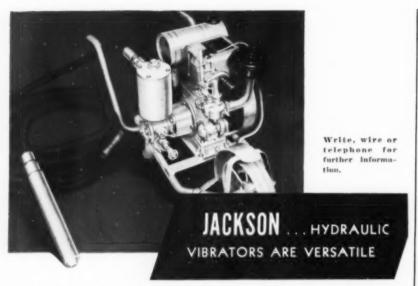
A Model 105 Schramm Compressor with special racks and tool boxes with fixed locations for each tool and accessory, so that most any compressor requirement that arises can be met and handled.

Equipment includes: Double hose reels, live air type, each equipped with three 50 ft. lengths of 3/4" air hose. Air receiver with three extra outlets, equipped with quick action valves, hose couplings and 31/2" vise for flat or pipe work, on swivel base. Tools recommended depend entirely on user's requirements and the ability of tool manufacturers to furnish them under existing conditions.

Schramm Model 105 is the answer to manpower shortage and the nuisance of miscellaneous purchases. Your priority assures quick delivery. So write now for complete details and prices contained in Bulletin C-9.

* * *

SCHRAMMINCORPORATED
THE COMPRESSOR PEOPLE
WEST CHESTER, PENNA.



... they give you what you want. Designed for a wide range of applications, the standard 23\%" diameter head is quickly interchangeable with a grinding head for use where wet rubbing or dry grinding is required. Use of a chuck in place of grinding wheel converts grinder into a drill.

A simple twist of the manual valve and you can have any speed, from idling to 6800 R.P.M. submerged. The JACKSON Hydraulic Vibrator gets things done. Economically! It is an ideal general purpose internal vibrator.

ELECTRIC TAMPER & EQUIPMENT CO., LUDINGTON, MICH.



(Continued from page 120)

day; on the best days as much as 1,000 ft. has been removed. Under favorable conditions the crew consists of only five men: dragline operator and helper; torch operator and helper and one laborer in the trench. The average daily progress with the trencher is also about 300 lin. ft. per day but its operation is more expensive.

Where the ground is not very stable and threatens to cave in on the freshly uncovered pipe, every endeavor is made to cut the 30-ft. section promptly and get it out as quickly as possible. After the pipe is out, caving in of the sides is not important unless the cut is near utilities. Backfilling, for the most part, is done with a bulldozer.

Where the dragline is excavating a trench overlaid by light asphaltic pavement it has been found possible to cut the pavement neatly by dragging the bucket toward the operator with the machine on the center line of the pipe. Because the center teeth of the bucket are removed, a clean cut is made in the pavement just the width of the trench, leaving the surface near the trench edges undisturbed.

Costs of Pipe Removal

Five bids were received on removal, reconditioning and relaying of this pipe. The range was from \$798,000 to \$1,290,000. On the items involved in the pipe-removal operation described above (which included squaring and facing the 30-ft. sections after removal) the bid prices ranged from \$296,000 to \$449,000. The principal items and the low bid figures on this phase of the project were as follows:

		UNIT	TOTAL
ITEM	QUANTITY	PRICE	AMOUNT
Excavation		\$1.97 0.80	\$126,000 63,000
Lifting pipe from trench	52,700 ft.	0.85	45,900

Where additional cuts had to be made in the pipe, that is, where sections were less than 30 ft. long as at specials and going around curves, the bid price was \$7 per cut. The specified figure on squaring and facing the sections was \$9.44 per section. The contractor's bid includes resurfacing of all paved surfaces removed (except about 13,600 ft. of the line in the city of Monrovia) and the restoration of all utility services disturbed in the pipe removal operation. In Monrovia (the only city traversed), arrangement was made to have a maximum of 500 ft. of trench open at any time during the job.

The low bidder for the job is the American Pipe & Construction Co., for which F. F. Jenkins is general superintendent

(Continued on page 124)



WHAT DOES THE W.P.B. ORDER RESERVING "PRESTONE" ANTI-FREEZE FOR CONSTRUCTION EQUIPMENT MEAN TO YOU?

* War Production Board Limitation Order L-51 as amended permits dealers to install ethylene glycol base anti-freeze in commercial vehicles. If the purchaser takes the anti-freeze away, he must sign a certification in substantially the following form:



The undersigned purchaser hereby certifies that the anti-freeze hereby ordered (manufactured from or containing ethylene glycol) will not be used in, or disposed of for use in, any passenger automobile as defined in War Production Board Order L-51.

SAVES CRITICAL EQUIPMENT!

With "boil away" alcohol frequent checks on the anti-freeze strength are necessary-often by inexperienced help. Accidental freeze-ups could result in ruined equipment. "Prestone" anti-freeze contains no "boil away"

BETTER NOT WAIT TO GET YOURS!

Supplies are unpredictable in wartime. To be sure of this vital protection, get your next winter's "Prestone" anti-freeze now!



The words "Eveready" and "Prestone" are registered trade marks of National Carbon Company, Inc. Unit of Union Carbide and Carbon Corporation

SAME PRODUCT AS ALWAYS



CAN'T EVAPORATE OR BOIL AWAY PROTECTS AGAINST RUST AND CORROSION ONE SHOT LASTS ALL WINTER-YOU'RE SAFE AND YOU KNOW IT!

PRESTON

"SPECS" for Safe, **Durable Suction** and Water Hose Connections . . .



"KING" Malleable Iron SHANK COUPLINGS

Strong, carefully made couplings of uniform quality, threading and dimensions. Easily inserted in hose and quickly connected and disconnected. Shanks have deep, clean corrugations. Pin lug swivel nuts are well recessed to hold washer when hose is disconnected. Heavy Pattern (Illustrated) has shanks long enough for two clamps, and pin lugs on both male and female ends. Sizes, 3" to 8", inclusive. Regular Pattern has pin lugs on female only, and shanks designed for one clamp. Sizes 11/2" to 3", inclusive.



'KING" HOSE CLAMPS SINGLE BOLT DOUBLE BOLT

The strongest clamps of their kind, and easiest to attach. Bolt lugs are heavily reinforced. Tongue, and ears for vise jaws, are full width of clamp. Perfect conformance to hose circumference, with broad bearing surface, insures equally distributed compression when clamp is tightened, without cutting into hose cover. Double Bolt style has quadruple take-up, providing exceptional gripping power. Sizes: Single Bolt, for hose 1/8" to 51/4", O.D., Double Bolt, for hose 31/2" to 171/4", O.D.

Carried in Stock by Manufacturers and Jobbers of Mechanical Rubber Goods.



(Continued from page 122)

and Thomas Wilcox is job superintendent. Julian Hinds is general manager and chief engineer of the Metropolitan Water District of Southern California and Henry J. Mills, resident engineer on this project, is in charge of operations in the field for the district.

Post-War Public Works

(Continued from page 63)

years as not representative and going back to the 20's for an estimate, this contractor stated that his firm's business in the decade from 1920 to 1930 was divided about one-third for private owners and about two-thirds for public bodies. Of the latter two-thirds, he estimated half was federal government work and half was for states, counties and municipalities.

If private enterprise is to assume the responsibility for expanding its production and distribution of goods after the war to proportions far beyond anything achieved in its best previous peace-time year, as desired by thoughtful industrialists today, it seems obvious that private owners are going to have much new construction to do in the months and years immediately following the peace. That much is conceded by the Constructors Association of Western Pennsylvania, but, because the first concern of the members is with the public works which supply the bulk of their business, construction for private owners has been assigned second place in their planning for post-war. A current activity of the association, however, is putting the member firms in a better position to stimulate planning now by private owners for future construction, as exemplified by the Turner Construction Co. in the article in the May issue of Construction Methods. The activity is aimed primarily at meeting contractors' present needs for employment.

Interim Employment for Constructors

Western Pennsylvania is a region of huge industries with heavy maintenance requirements. Manpower in these industries today is extended to the limit to carry the heavy load of production and distribution for war. Contractors just now are entering the final stretch of the race for rapid war construction. Many (Continued on page 126)

*FINISH **Heavy Construction** FASTER



5 H.P. MALL Gasoline Engine Chain Saw 36" Capacity. Also available in 24" and 48" sizes. Cut Heavy Timber and Piling in a Fraction of the Time Required by Hand.

• 8 Features that Save Time & Labor.

1. Automatic clutch provents stalling the engine when saw is pinched or forced too hard. Eliminates hand clutch centrol. Only necessary for operator to manipulate engine throttle when ready to cut.

2. Cuts piling to within 2 laches of the ground.

3. Easy starting assoline engine.

4. 360° index permits horizontal, vortical, or any angle

Safety quard on all models

Safety guard on all models.
 Electric or gasoline engine chain saw sharpeners available for sharpening chains in shop or field.
 Easily carried anywhere on the job.
 Provides saw mill performance in remote areas.

Literature and Prices Mailed upon Request

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In view of present day difficulties in maintaining your own mailing lists, this efficient personalized service is particularly important in securing the comprehensive market coverage you need and want. Investigate today.

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If wire ropes are to give their best service—yes, even longer-wearing HAZARD LAY-SET PREFORMED—they must be lubricated regularly—and correctly. Not only will proper lubrication protect the many wires from corrosion and excessive wear, but will permit the internal wires which move one against another when the rope passes over a sheave or winds on a drum, to slide more freely and with less friction. For some short-lived services, factory lubrication is sufficient. For others, additional lubricant must be added in the field, and unless this is done with sufficient frequency, your wire rope is doomed to fail before its proper time. And this is no time to

HAZARD LAY-SET PREFORMED WIRE ROPE ordinarily gives so much better, easierhandling, longer service than ordinary non-preformed rope that occasionally operators take its exceptional qualities for granted and forget the oil can. Don't do it. Lubricate your LAY-SET correctly, and you will get even longer service-even greater dollar value. All Hazard ropes identified by the Green Strand are made of Improved Plow Steel.

HAZARD WIRE ROPE DIVISION

Wilkes-Barre, Pa., Atlanta, Chicago, Denver, Fort Worth, Los Angeles, New York, Philadelphia, Pittsburgh, San Francisco, Portland, Tacoma

AMERICAN CHAIN & CABLE COMPANY, Inc. BRIDGEPORT, CONNECTICUT

IMPORTANT SUGGESTIONS

cating. Use kerosene and wire brush.

Passing the rope through high-pressure jetted steam has proved a very effective means of cleaning, especially larger diameters.

Wipe off excess lubricant.

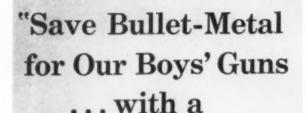
Frequent lubrication with light-bodied lubri-

heavier lubricants

Lubrication of any wire rope is sufficiently important to warrant calling in one of the industrial lubrication men employed by oil companies or a Hazard man. These men can tell you which lubricant will handle your prob-

Clean wire rope thoroughly before lubricant is better than infrequent treatment with

HAZARD LAY-SET



FIST-GRIP on Wire Rope"

"YOU can save rope, save clips — just as we do — by using Laughlin 'Fist-Grip' Safety Clips, instead of 'finger-pinch' U-bolt clips that crimp and injure wire rope.

"With 'Fist-Grip' Clips the bolts are on opposite sides — the four bearing surfaces grip like a fist, not a 'finger-pinch'. Three 'Fist-Grip' Clips do the work of four U-bolts! Design is so strong that less steel is needed in each clip. 25% less steel in all is saved per assembly.

"I figure the rope, clips and steel saved mean more guns and bullets for our boys."

Competitive Tests Prove Greater Holding Power of Laughlin "Fist-Grip" Clips

With 4 U-bolt clips at 37,750 lbs. load, ¾" rope broke at saddle, while only 3 Laughlin Safety Clips held the same load without rope breakage, because extra bearing surfaces grip without crimping. Here's the clip that fights for your country! Investigate!





YOU can save manpower

and metals with the

"FIST-GRIP" CLIP

greater holding power, less work; can't

no special-shaped wrench, fewer clips

needed, no spoiled rope, 25% less steel.

Saves Manpower

e put on wrong.

Saves Metals









(Continued from page 124)

already are contracting their activities and reducing their field forces. Putting these facts together, the executive secretary of the Constructors Association offered a timely suggestion and, in characteristic fashion, transformed the idea into action.

On April 17, Roy MacGregor sent out a letter to the chief engineers, managers or responsible officials of 76 large industrial firms: railroads, utilities, steel and aluminum companies, glass producers, electrical manufacturers, refractories, foundries and manufacturers of steel products. Later a similar letter went out to the chief engineers or managers of all member companies in the Western Pennsylvania Bituminous Coal Operators Association. Under the letterhead of the Constructors Association, the letter read as follows:

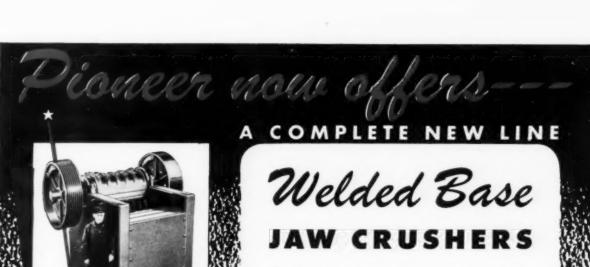
"Actual construction work providing plant capacity for increased production of war requirements which has been going on for the last eighteen months is rapidly nearing completion and the facilities of this industry are becoming available for other activities. Many of the men in this industry are exempt from call to war duty and are not fitted to carry on work other than what they have regularly followed. In writing to you we have this thought in mind and we trust you will give it consideration for the mutual benefits to be secured. The thought is this:

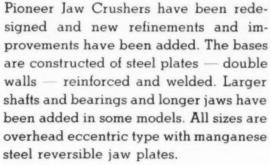
"You have much maintenance work which is similar to the regular work of this industry and which probably could be done by men from this industry at an advantage to you as to the cost. Again, you no doubt employ a regular maintenance crew which would be more valuable to you in your production efforts if released from the maintenance work.

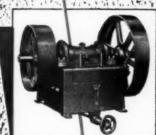
"Also, there is a shortage of manpower facing many companies which might be relieved if construction firms were called in to do your maintenance work and your maintenance men were placed in production. There is also the probability that one of our firms could handle the maintenance of a number of plants with less men than are required to maintain a crew in each plant separately.

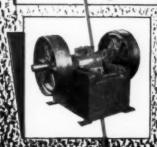
"This area is fortunate in having firms capable of measuring up to the highest standards who would welcome such an opportunity to serve you and help not only you but the nation as well. A discussion of this with any of the members of this Association should be helpful to both you and them. If this office can help, command us."

A copy of the letter, with the names (Continued on page 128)











PIONEER JAW CRUSHER SIZES: 3042 — 2436 — 2036 — 1536 — 1036 — 1524 — 1024 — 1020 — 1016

All sizes of Pioneer Jaw Crushers are equipped with SKF self-aligning bearings. The 1016 and 1020 are also available with bronze bearings.



The man was the many of the first the last to the same and the same and

ENGINEERING WORKS
MINNEAPOLIS, MINNESOTA, U. S. A



C OMPARABLE with our amazing new mobile cannons for effective penetration of the heaviest tank armor are Owen Buckets designed especially for fast, deep digging unusually difficult materials such as hardpan, quicksand, coal in the vein, etc.

THE OWEN BUCKET CO.

6020 Breakwater Ave., Cleveland, Ohio

BRANCHES:
New York Chicago Philadelphia, Berkeley, Cal.



OWEN BUCKETS

UNUSUAL OPPORTUNITIES FOR GRADUATE ENGINEERS!

Consolidated Vultee Aircraft Corporation plays an important part in the production of all types of aircraft for the United Nations' Fighting Forces. This effort to maintain production must be supported by an adequate supply of manpower. There is a serious shortage of Engineers which may dangerously interfere with this production of airplanes we need.

If you are a graduate engineer and would like to engage in essential war work, there may be a place for you at Consolidated Vultee Aircraft Corporation—a position offering ample opportunity for advancement and increased earnings. Aeronautical experience is not necessary.

If you are a United States citizen not now employed in an essential war industry, agriculture, dairy, poultry, ferrous and nonferrous metal, or lumber industries; or if you have a certificate of availability from the United States Employment Service office or War Manpower Commission of your area; write us today stating your school, degree, age, experience, draft classification, and marital status. We will send you complete information.

We have plants located in California, Texas, Tennessee. Louisiana, Michigan, Pennsylvania, Florida, Arizona, North Carolina, and Kentucky. In the event you are accepted for employment, we will assist in locating housing facilities for you and your family, and will pay your expenses to the place of employment.

This is your opportunity to get into essential war work and, at the same time, a business with a great future. DON'T DELAY! Write us today!

CONSOLIDATED VULTEE AIRCRAFT CORP.

INDUSTRIAL TRAINING DIVISION . SAN DIEGO, CALIFORNIA

(Continued from page 126)

of the men to which it was addressed, was sent to each of the member companies of the Constructors Association with a note suggesting that they follow up the lead here given to develop current work on maintenance for the industries approached. Maintenance jobs thus obtained may serve as an opening to future construction for the same private owners. Development of such business rests logically with the individual contractors rather than with the association, for reasons which will be mentioned later.

Individual Follow-Ups

Once the leads for current maintenance work had been opened up by the executive secretary, the association's official contact with the present development ended. Cultivation of the possibilities had to be done by individual member concerns. Some evidence of the way in which the suggestion was received by industrial engineers and managers did filter into the executive secretary's office in the form of written acknowledgments. These letters did not (in fact, they could not, on such short notice) commit the writers to full acceptance of the idea, but they did in all cases signify that the suggestion had been gratefully received and that it would be given earnest consideration. A letter, briefer than most, from the chief engineer with headquarters in Pittsburgh for a large region of a great railroad system, is typical. This is the chief engineer's reply:

"I have just received your letter of April 19th, and hasten to thank you for your offer of assistance in our maintenance work. You may be sure that we shall bear in mind your thoughtful tender given in this time of stress."

Approach to Private Owners

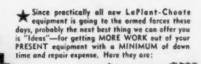
Heavy industries in Western Pennsylvania are in all eras—peace-time, wartime, prosperity or depression—large buyers of new construction. The volume varies, but the market is always there. Many of these industries, particularly in recent years, have tended more and more toward construction with their own forces. The arguments in favor of this method of construction are many, but they can never surmount the demonstrable fact that contract construction gives the owner a better product at a lower cost.

Means have been considered from time to time by the Constructors Association for carrying this fact home to private owners, with the object of combatting the trend toward construction by owners' forces. It so happens, however, that

(Continued on page 130)

12ways

TO GET BETTER, LONGER-LASTING SERVICE FROM YOUR 'DOZERS AND SCRAPERS





- Always travel with your 'dozer blade raised slightly but NOT TOO HIGH. Traveling at extreme height of lift causes excess strain on 'dozer frame and control mechanism. Same is true of any CABLE-CONTROLLED scraper. Traveling with bowl at full height is likely to snap a cable or rip out a power control unit—especially on rough ground.
- 2 Never ram the rear of your scraper with a pusher tractor. Make contact as EASY as possible to minimize shock on both machines.
- When completing an up or down stroke on a hydraulic rig, always return main valve handle to neutral position, to prevent by-passing oil through high pressure relief valve. This subjects entire system to unnecessary strain.
- Don't try to "Billy-goat" large boulders with your 'dozer. Make contact GRADUALLY before applying power. If boulder is deeply embedded, it may be necessary to 'doze a trench around it first.
- 5 In 'dozing big trees: (1) blade-cut roots on side from which you are going to push. (2) Build dirt ramp on same side. (3) Raise 'dozer blade high against trunk to gain additional leverage before "gunning" power.



- 1 Keep your HYDRAULIC SYSTEM clean. Maintain proper oil level in tank and change oil as often as it appears dirty. Use good grade SAE No. 20 motor oil in winter; SAE No. 30 or No. 40 in summer.
- 2 Check OPERATING PRESSURES periodically. Do not adjust relief valve any higher than required to operate machine efficiently.
- 3 Check suction and power HOSE to make sure inner lining is solid and intact. Prevents pump "starvation," keeps oil circulating freely through the system.
- 4 Replace worn CUTTING EDGES and end bits promptly to prevent damage to main blade—thus saving time and cost of a major overhaul job.
- 5 Check machine regularly to make sure 'dozer MOUNTING BOLTS are tight. Replace worn connecting pins promptly.
- 6 Lubricate all FITTINGS on 'dozer each time tractor is serviced. LaPlant-Choate rigs have same type grease fittings as your "Caterpillar" tractor.
- 7 Maintain correct air inflation in scraper tires—very important in preventing rock cuts, bruises, fabric breaks, etc. Follow tire manufacturer's recommendations.

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(Continued from page 128) every industry in the region, no matter how firmly wedded to the principle of construction by day labor under control of its own supervisors, does let a considerable volume of work by contract. Often the contracts are only for those portions of a project which a skilled and wellequipped contracting organization can obviously do at much lower cost than the owner. An industrial concern ordinarily gives repeated orders for these classes of work to contractors who have served it well in the past, and the contractors thus involved are reluctant to have this business opened up to competitors, even though the opening might result in a larger volume of business all around. This consideration alone has been enough to keep the association from attempting

anything official up to the present. With respect to development of future plans, including post-war, by private owners, stimulation is likely to be most effective if it comes from individual contractors, as indicated in the article in the May issue. The Constructors Association of Western Pennsylvania recognizes that it has a job to do in urging its own members to undertake this stimulation of plans by private owners for post-war construction. Public works come first on the association's calendar, but as soon as they are properly provided for, attention will be given more largely to stimulating plans for construction by private indus-

TVA's Tenth Anniversary

(Continued from page 79)

bought from private owners. All but two storage dams in the system carry, or will soon carry, electric generators and the two exceptions store water that supply generators. More than 75 percent of the developed power is going into war. At the current rate of power generation, TVA ranks second among the major power systems of the United States.

TVA has also rehabilitated and placed in operation the Muscle Shoals ammonium nitrate plant, constructed in 1918, and has constructed a new ammonia plant. As a result of research in electric furnace production of elemental phosphorus, it is one of the largest producers of phosphorus for military use in incendiary bombs, smoke screens, tracer bullets and other products.



CRUSHING AND SCREENING PLANT

U. S. Army Engineers are building a huge dam in Tennessee. It will require 1,500,000 tons of aggregate-4 sizes of crushed rock: 3"-6", 11/2"-3", 3/16"-3/4", minus 3/16"; and one size of sand.

To produce this material, Ralph E. Mills Co., of Roanoke, Va., opened a quarry at the dam site. The rock is a high calcium limestone. Telsmith designed the complete crushing and screening plant, and furnished most of the equipment. Capacity is in excess of 200 tons per hour.

On war jobs, equipment as well as men must produce more and faster without "cracking" under the strain. For years Telsmith has been building equipment that

can turn it out, without taking time out. Telsmith complete sand and gravel and rock crushing plants are a known quantity to miners, contractors and aggregate producers.

That's why Telsmith gets the call on so many war jobs-to build army and navy air bases, dry docks, roads, dams, and other big construction projects.

That's why your Uncle Sam is now taking most of the Telsmith equipment being built. It's going overseas, to build for the armed forces' needs.

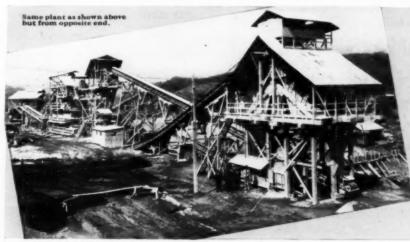
You can get Telsmith equipment—for war work nowand after the war for all your needs. Get Bulletin Q-10 today.

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18" x 21' Telsmith Belt Conveyors

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Have patience with your dealer if he is unable to furnish all of the numerous LOWELL types and sizes, for we are engaged, for the duration, in supplying the needs of our Armed Forces.

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1

Reversible Ratchet
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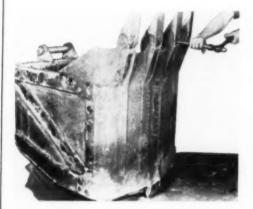


See how each pawl, when engaged, transmits leverage from the solid stock of the handle, direct to the gear, in a straight line and with a "square" contact. The pawl is in COMPRESSION ONLY—no shear, no tension, no torsion. The shipper carries NONE of the load. This strong construction insures steady service.

War Spotlights Need for Maintenance of Power Shovels

CONSTANT CARE and intelligent maintenance are essential for conserving power shovels and similar equipment, according to a bulletin recently issued by George E. Miller, chief engineer, Buckeye Traction Ditcher Co., of Findlay, Ohio.

Pointing out that production of power shovels for commercial use has practically ceased, he declares, "All work not under the direction of our armed forces must be carried on with equipment now available for private jobs. Because of its brute strength and ability to go almost anywhere on powerful crawlers, the uninitiated look on the modern power shovel as something that will slug its way along until it falls apart from old age. I am afraid that a great many owners and operators have much the same idea. When the man who runs one really ap-



DIPPER TEETH are removed for repair or replacement. Removal is accomplished by simple operation of knocking out pin. Teeth can be built up by welding or, if badly worn, by tacking on piece of repointer bar and then welding.

preciates the careful adjustments and close relationship of parts in a shovel, he will see the need for redoubling his maintenance operations if the machine is to remain in use. Careful attention to minor and often overlooked service operations will materially lengthen the life of the unit.

"That proper lubrication is vital to upkeep is recognized by all makers of earth-moving equipment, and each man-

(Continued on page 134)





at the same time RING-FREE REMOVES CARBON

This is no time to let carbon and unnecessary wear waste hard-to-replace parts...waste fuel ... waste productive horsepower. Lubricate your power plant more efficiently with Macmillan RING-FREE Motor Oil. By reducing friction fast, RING-FREE delivers direct to the driveshaft more of the horsepower ordinarily wasted in overcoming motor friction. And in addition, it actually removes carbon while the engine runs! Carbon removal is a natural RING-FREE function, inherent in the crude oil and retained by the exclusive Macmillan patented refining process. To remove carbon...to minimize "downtime"...to get maximum fuel conservation... and to get all-out performance - start using RING-FREE now!

Macmillan RING-FREE Motor Oil combines these vital qualities: 1—Removes Carbon, 2—Reduces Friction Fast, 3—Saves Fuel, 4—Has Great Film Strength, 5—Has High Heat Resistance, 6—Long Cling to Metal, 7—Fast Penetration, 8—Is Non-Corrosive, 9—Is Less Affected By Dilution.

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A VERITABLE encyclopedia, this book is a complete reference on all kinds and types of structural members and their connections, including not only general theory pertaining to all structural members but also their detailed design and design of their connections with other members—it is a bandy manual of quick-reference tables, design graphs, diagrams, etc., to speed up calculations—a convenient single source of A.S.T.M., A.R.E.A., A.I.S.C., and A.C.I. standards design stresses, code excerpts, etc., etc.

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(Continued from page 132)

ufacturer provides charts on which all lubrication points are clearly indicated, together with the type of lubricant to be used at each point and the interval between lubrication periods. Realizing that



ADJUSTMENT is made on hoist-clam brake lifter and (below) on hoist-clam clutch.



the many grades and classes of lubricants required reduction and simplification, the War Department, after much study and many tests and experiments, has set up a modified lubrication program calling for three oils, five greases and two gear lubricants which it is believed will suffice for the needs of all heavy machinery and

(Continued on page 136)





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CEMENT

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get your bulk cement to difficult
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Large, fast, and economical, it will solve
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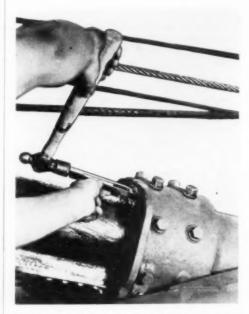
For semi-trailer mounting, this unit is available in capacities from 95 to 120 barrels: Twin screws unload the cement at controlled speeds.

BUTLER BIN COMPANY
WAUKESHA WISCONSIN

(Continued from page 134)

permit uniformity of manufacture by the different refiners.

"Broken down, these army specifications call for three general purpose greases, a water pump grease and a wheel bearing grease, two gear lubricants, SAE 90 and SAE 80, and three engine oils, SAE 10, SAE 30 and SAE 50. Although some deviation from this list was formerly deemed advisable for the most efficient performance of some particular machine, it appears to be the con-



SADDLE BLOCK is tightened with shims. It is important to make sure that block does not wear loose.

sensus among most purveyors of equipment of the power shovel type that the kinds of lubricants enumerated will be adequate for almost all normal lubricating purposes. I believe that this action of the Army Corps of Engineers means a step toward a greater uniformity in lubricating specifications and a decided reduction in the type and grades that will be used after the war.

"The engineers point out that while the War Department lubrication program is intended to simplify lubricants for army equipment to the lowest point consistent with efficient operation, there will actually be more than the ten mentioned lubricants available in the field. This is because the so-called standard lubricants will not completely perform the specialized functions of certain special fluids required for hydraulic brakes, shock absorbers and the like. However, with the trend toward simplification fully understood by refiners and lubrication engineers, it may be assumed that designs of

(Continued on page 138)

Crushed Rock

Millions of yards are needed for barracks footings, war plants, military roads, airports. Speed is important so is freedom from repairs and break-downs. Universal rock and gravel crushers and crushing plants have established records for production and low maintenance costs.

And Asphalt Maintenance

-is also important. We have to conserve what we've got—even down to roads and streets—and manpower. The Universal "Twin Dryer" Asphalt Plant does both. Turns out specification asphaltic material for patching and small paving jobs, at low cost per yard. One man can turn out up to 40 tons per hr.

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- are needed for the thousands of pilots necessitated by global war; runways and landing strips for training use, and at defense bases. Spreaderollers have spread chips in three layers—large chips first, medi-um next and small chips on top— and rolled them firm and smooth, at many air fields. Spreaderolled seal coating lasts - saves material and maintenance.

Besides this essential construction and road building equipment, we are supplying pulverizers to fertilizer manufacturers and explosives plants.

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for the "fightingest" army in the universe — the U. S. Army!

Fighting a Universal War This 899-Q quarry plant, with separate primary and secondary units, averaged 791/2 yards per hour on a southwest airport job "Twin Dryer" Asphalt Plant keeps Seattle's asphalt pavements in good shape for the duration. Universal reduction crusher and pulver-izer turns out 100 tons of aglime daily for Illinois' "Little Egypt" farmers. Spreaderolled landing strips are smooth, thoroughly com-pacted, water repellent and easy to maintain at this Texas Precision dies and gages made in Universal shops for our production of ordnance parts. mmonojimmonia

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A pound of REPAIR * * * is worth a ton of REPLACEMENT

Equipment kept in repair has double WAR Value

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That's the whole story in a few words. Surely no hardheaded and patriotic equipment user needs to be SOLD on the urgent need for "doing the most with what we have." If you're using Reliance Products and repairs DO become necessary, you'll find their rugged simplicity a big asset in such work. There's nothing complicated or hard-to-fix about Reliance Equipment. The same construction that makes them stand up on the job makes them easier to fix. Don't wait for breakdowns. Go over your equipment NOW and you'll be well repaid for your time and trouble.

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If you're using Reliance prod-ucts, tell us which ones and we'll be glad to advise you how to stop trouble before it starts. This service creates no obligation on your part. Write us

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MILWAUKEE, WIS.

(Continued from page 136)

the future will take into consideration the justifiable limitations imposed by the War Department, and some of these special fluids may be dispensed with eventually.

"Another innovation introduced by the Engineers in connection with lubrication is the employment of 8 hr. as a time unit. This method provides for proper and regular lubrication at the end of each 8-hr. interval of use. In peace time, 40 to 60 hr. may constitute a working week. On a military project or on two- and threeshift private operations, a piece of earthmoving equipment may be in operation 24 hr. a day. When this happens, the operator finishing the shift greases all points calling for 8-hr. service before

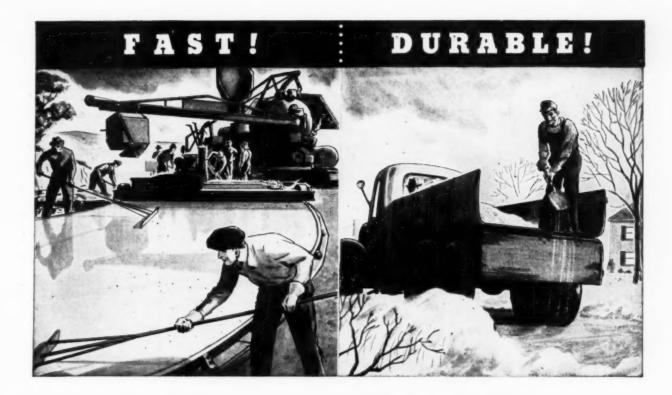


CROWD CHAIN which drives dipper stick is tightened by adjusting deck idler, thus lengthening its life.

turning the equipment over to his successor.

"Continuous and thorough inspection of all parts is another military mandate that the civilian operator will do well to follow. Frequent testing and scrutiny will anticipate many of the things that go wrong with a shovel. When proper adjustments are not made, wear increases and the time when you will have to repair or replace the part or assembly grows less. If indications point to something amiss, stop the shovel at once, find out what is causing the trouble and correct it. Here is evidence that an intimate knowledge of your machine will increase its life and usefulness for only study and experience can teach you to recognize the

(Continued on page 141)



Laid to stay SMOOTH!

CONTRACTORS AND ENGI-NEERS report success with Vinsoltreated cement on a variety of jobs, including highways, aprons, and taxiing surfaces at airports, as well as in foundation work and slip-on construction.

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to keep in mind. Experiences over the last 5 years show that the use of Vinsol-treated cement not only eliminates virtually all danger of scaling, but also saves time and money.

A typical report from a northern city states that Vinsol-treated cement laid side by side with normal portland cement showed no signs of scaling in spite of exposure to constant freezing, thawing, and the action

VINSOL*-TREATED

CEMENT

RESISTS SCALING

of de-icing agents. On the other hand, the normal portland scaled right up to the joint separating the two surfaces.

Saves Time and Money in Laying

In addition, reports record many other advantages. Vinsol-treated cement, for example, is more workable—less subject to bleeding or

segregation. Consequently, time and money are saved in spreading and finishing.

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Chances are your supplier has Vinsol-treated cement, together with full instructions on its use. We have published a 44-page booklet, "Better Roads Ahead," in which practical authorities tell of their experiences. Mail the coupon today for your copy.

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Specify Vinsol-treated Cement for Longer Surface Life

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Name_						
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Name_					itle	
Name Company					itle	_

THE EXECUTIVE WHO STOPS TO THINK . . .



Knows that "10% for War Bonds isn't enough these days"

Workers' Living Costs going up... and Income and Victory Tax now deducted at source for thousands of workers...

Check! You're perfectly right . . . but all these burdens are more than balanced by much higher FAMILY INCOMES for most of your workers!

Millions of new workers have entered the picture. Millions of women who never worked before. Millions of others who never began to earn what they are getting today! A 10% Pay-Roll Allotment for War Bonds from the wages of the family bread-winner is one thing—a 10% Pay-Roll Allotment from each of several workers in the same family is quite another matter? Why, in many such cases, it could well be jacked up to 30%—50% or even more of the family's new money!

That's why the Treasury Department now urges you to revise your War Bond thinking—and your War Bond selling—on the basis of family incomes. The current War Bond campaign is built around the family unit—and labor-management sales programs should be revised accordingly.

For details get in touch with your local War Savings Staff which will supply you with all necessary material for the proper presentation of the new plan.

Last year's bonds got us started—this year's bonds are to win! So let's all raise our sights, and get going. If we all pull together, we'll put it over with a bang!

This space is a contribution to America's all-out war effort by

CONSTRUCTION METHODS



you've done your bit

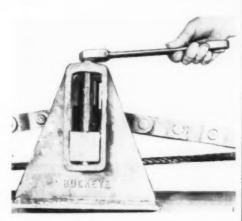
Page 140 — CONSTRUCTION METHODS — July 1943

(Continued from page 138)

little things which are the forerunners of greater mishaps.

"Make sure that all chains are maintained at the proper tautness, and see that they are well greased at all times. This is especially true of the crawlerdrive chains and the chain-driven boom hoist. The tightness of the crawler belt should also be watched closely. Repairs on clutches and brakes should be made carefully and always with the proper tools. When assemblies are taken apart, adjacent and related assemblies should be checked for wear at the same time. They are usually much more accessible at that time.

"It is vital that all keys, pins, seals and other small items be restored in the same way and to the exact position from which they were taken. Careless re-assembly



IDLER on shovel boom is adjusted

after a repair or a replacement has been made can often do more damage than the original disorder. When dis-assembling a unit, all parts must be plainly marked not only to facilitate re-assembly, but to prevent injury from faulty positioning. Having a piece of mechanic's chalk handy may save hours of guesswork. Mark each piece and each position and you will not have to resort to the trial and error method.

"Bear in mind that the job a shovel does is a heavy one, and no matter how strong the materials used in building it or the care and accuracy in connecting and adjusting the various sections, stress and wear will eventually take their toll. Especially is this true in the case of buckets and dipper teeth. To maintain your front-end equipment at a high working standard, watch the cutting edges. A shovel, trench hoe, clamshell or dragline cannot dig effectively with dull, worn teeth. Teeth can be removed and replaced by the extremely simple operation of knocking out a pin. However, if new teeth are not available, the old ones can be built up by welding or, if badly

(Continued on page 143)



Porto-Power could be called an "educated" hydraulic jack. It does lift, push, pull, clamp, twist, bend and press jobs. Its utility is limited only by the ingenuity of the operator. No one has yet discovered all the uses for Porto-Power - but here are just a few of them:

- ★ Pull drive pulleys, gears and ★ Straighten foundry flasks.
- ★ Lift, move and position heavy ★ Forcing freight car doors. nachinery, boats, materials.

- ★ Pressing and riveting operations.
- representation Push over walls, etc.
- ★ Bend angle iron, mono-rail and other material.
 ★ Serve as hydraulic unit for stationary press.
- ★ Speed up shoring operations.
- * Push back cave-ins.
- ★ Production and assembly oper-

- * Straighten line shafts.

- machinery, boats, materials.

 ★ Straighten bent frames and axles on trucks, tractors and machines.

 ★ Push out dented dump-car panels.

 ★ Lifttimbers in dangerous quarters.

 ★ Pressing and riveting operations.
 - ★ Clamp parts for welding.
- * Straighten metal concrete forms. * Pipe and conduit bending.
- ★ General service in building con. ★ Push out pins and press-fitted parts.
 - * Test breaking point of materials.
 - ★ Weigh large structural members.
 - ★ Lift, push, pull, bend or straighten with combinations adapted to any job.

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1—10" x 8" Ingersoll Rand, type 20, single stage, 4 steel wheels	1000.00	1-6" Carter, SPC, G.I
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1-53 McKiernan-Terry 2-55 McKiernan-Terry	200.00 350.00	steel 1—10" x 10" Amer. W 2500 GPM @ 30' T1 10—3" Humphryes, Doub
PUMPS		10—4" Humphryes, Doub
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worn, by tacking on a piece of repointer bar and then welding.

"In connection with the shovel boom, check sheaves and cable frequently. Make sure that the saddle block does not wear loose, and watch the bushings of the shipper shaft. Proper adjustment at all times will prolong the life of the crowd chain which drives the dipper stick. When the chain on your dragline shows signs of wear, it should be reversed as the greater wear comes on the bucket end. Mud, sand or other materials that you are digging should be kept out of sheaves, fairlead and other places where they might act as abrasives.

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"Naturally smooth, trouble-free operation of the unit's power plant is essential. Here are 'Ten Commandments' of engine operation which will give you days free from engine trouble:

- Know your engine thoroughly. Read the manual of instruction furnished by the manufacturer and do the things advised in it.
- (2) Keep the engine and its accessories clean. Dirt often hides trouble in the making. Look for loose connection or bolts as you clean.
- (3) Keep the radiator filled with clean water. Never add water to an overheated engine.
- (4) Use only the oil of recommended specifications.
- (5) In starting, use the choke no more than necessary as too much use of the choke allows gasoline to dilute the oil.
- (6) Warm up the engine slowly when the weather is cold. Never race a cold engine.
- (7) Do not force the engine. Avoid overload. When not using the engine, idle it; stop it if the period is prolonged, unless the weather is sub-zero; then allow the engine to idle.
- (8) If trouble develops, correct it before it becomes serious. Don't run an engine that is not operating properly.
- (9) Always keep the air and oil filtering systems clean.
- (10) Personally inspect the engine and its accessories daily.

"Take note when your engine is hard to start, when it misses, when it knocks, when it overheats, when it loses power, when you have a smoky exhaust, when it backfires, when the radiator boils—all these are definite indications that something is wrong, and should be immediately attended to by the operator.



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